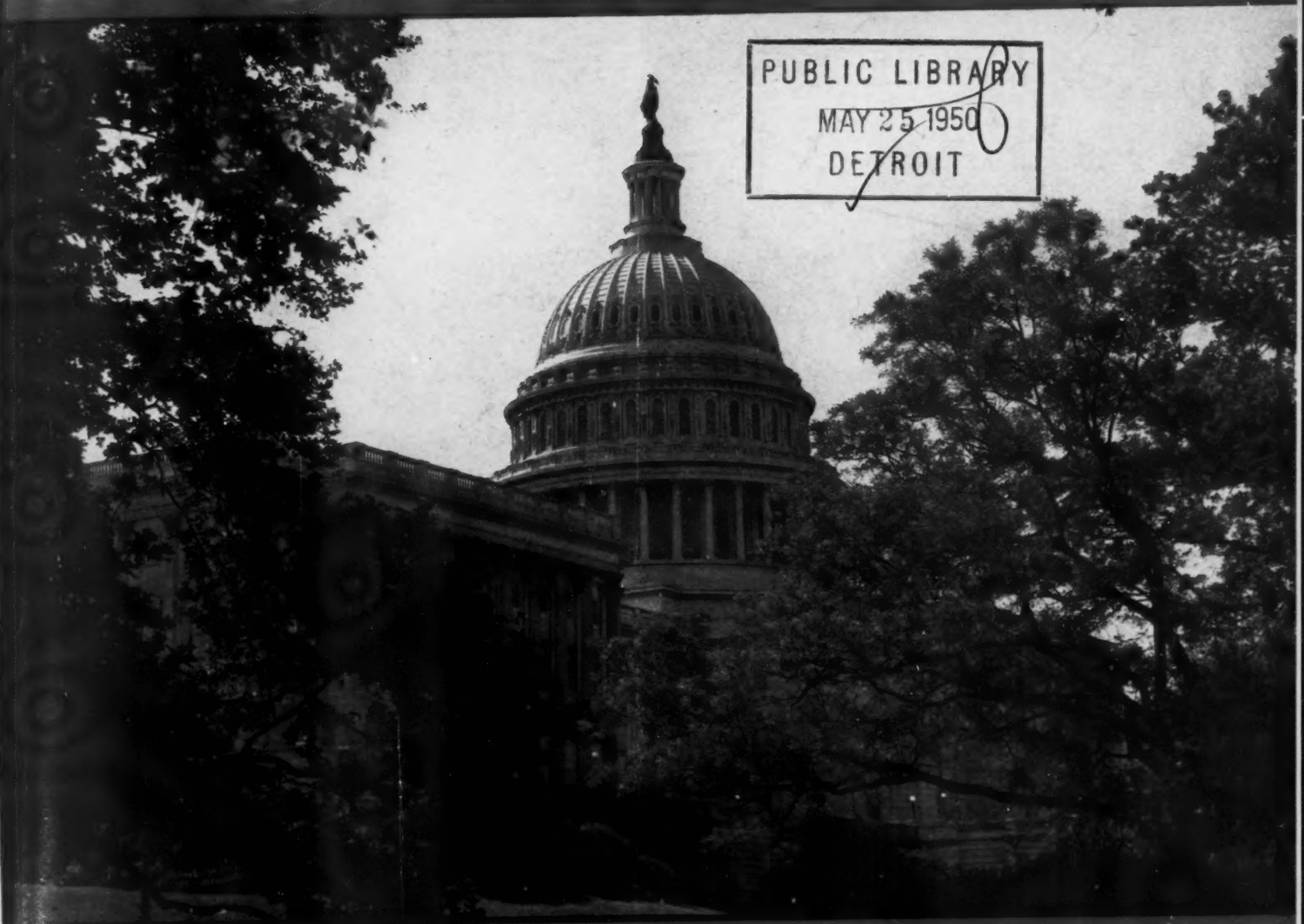
TECHNOLOGY DEPT.

MAY, 1950

Telephone and Management Engineer



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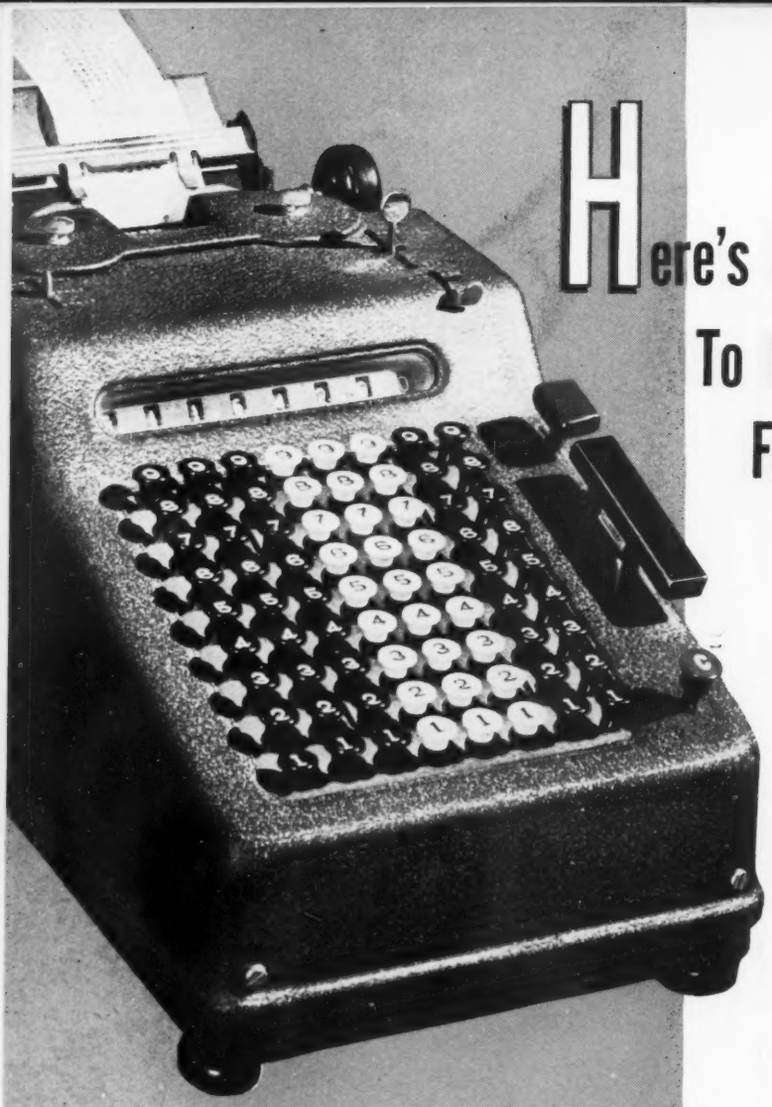
THE NATIONAL TELEPHONE MAGAZINE

Featuring —

"TOLL CIRCUITS BY RADIO–TODAY"

By Edward Daskam, Jr.



Here's How To Make More Net Profit From Your Telephone Directory

Every telephone company is entitled to a substantial net profit from directory operations. However, many companies are not receiving the profit to which they are entitled.

Consider these facts if you would like to make more money from your telephone directory.

All of our key personnel have had years of experience in the telephone business proper. Our methods are designed to coincide with sound telephone company management. All of our specialists are trained accordingly.

Because of our actual telephone operating experience plus experience in publishing directories for large and small companies from coast to coast you can expect us to produce a money-making directory for you.

Let our representative show you our records of the increases in net profit which we have made for telephone companies of your comparative size. Let him explain our Complete Directory Service Plan which includes all phases of directory publication; sale of advertising, layout, compilation, proof-reading and printing.

Let him show you how you can make more money from your telephone directory.

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420 Columbia Street, Lafayette, Indiana • Telephone 4854
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604 Pine Avenue, Long Beach 12, California • Telephone 6-7221
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GENERAL TELEPHONE DIRECTORY COMPANY

Nation-wide Publishers of Telephone Directories

Lakeland Exchange of Peninsular Telephone Company, which serves the prosperous citrus-growing and industrial areas of west-central Florida.

Bank of 26-cell Exide-Manchex Batteries in Lakeland Exchange.

EXIDE-MANCHEX BATTERIES

assure positive operation of telephone equipment at Lakeland, Florida

Expansion of telephone facilities has gone fast and far at this modern exchange of the Peninsular Telephone Company. Out calls more than doubled during the past ten years. Many miles of lines and cable have been placed. Much new equipment has been added, including an Exide-Manchex (26 FHE-17) Battery, which will supply up to 4 hours of peak-load service.

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THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

Across The Editor's Desk

Congratulations to the Kansas Telephone Association on the Golden Jubilee Convention marking the 50th year of that organization. Their meeting, in progress as this issue is mailed, will start with a pre-convention fun day including a golf tournament. The Nebraska Telephone Association held their 50th annual meeting in late March. We join the industry in wishing them continued success in their worthwhile work.

• • •

E. A. TULL of the Lapel (Ind.) Telephone Company is also celebrating his 50 years of service to the Independent telephone industry this year. At the Indiana Telephone Association annual convention held early this month Mr. Tull received many congratulatory messages.

• • •

While at the Indiana convention we visited the Metholist Hospital to pay our respects to MR. J. K. JOHNSTON, well known Consulting Engineer and founder of the Independent Telephone Pioneer Association, who has been confined to that hospital for the past 13 months. J. K. asked us to extend his best wishes to his many friends in the industry.

• • •

CHARLES D. "CHUCK" EHINGER, secretary and general manager of the Citizens Telephone Company, Decatur, Ind. was one of the principal speakers at the Indiana meeting. If you would put "Chuck" in a radio station before a microphone you could not detect him from the famous Herb Shriner, another famous Hoosier, in delivery or in thought provoking comment. See our issue of May 1 for his biographical sketch. His hobby: photography and children.

• • •

Our 1950 COMPOSITE CATALOG & BUYERS' DIRECTORY is being mailed this month to EVERY telephone company in North, Central and South America. Included is a New "TELEPHONE PLAN BOOK" which will make your copy more valuable than ever. All subscribers will receive an individual copy—subscribe now if you want your own copy.

The National Telephone Magazine

TELEPHONE ENGINEER and MANAGEMENT

MAY, 1950 **VOL. 54, NUMBER 5**

Editor, **RAY W. SMITH** • *Advertising Director,* **ROY F. SMITH**
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ARTICLES

Washington Bureau Reports	Roland Davies, Fred Henck	29
Rebuilding The Rural Outside Plant	John S. Reed	31
Toll Circuits By Radio Today	Edward Daskam, Jr.	38

—Coming Conventions 30—

FEATURES

Across The Editor's Desk		4
Telephone Engineer Newsletter		15
Editorial		25
Nebraska Holds "Golden Jubilee" Convention		46
Iowa Convention Report		68
Kentucky Convention Report		72
Back of The Book	John G. Reynolds	86

DEPARTMENTS

Rural Telephone Activities	6
Professional Cards	78
Classified Advertising	80
Buyers' Guide	82
New Products' Showcase	82
Advertisers' Index	85

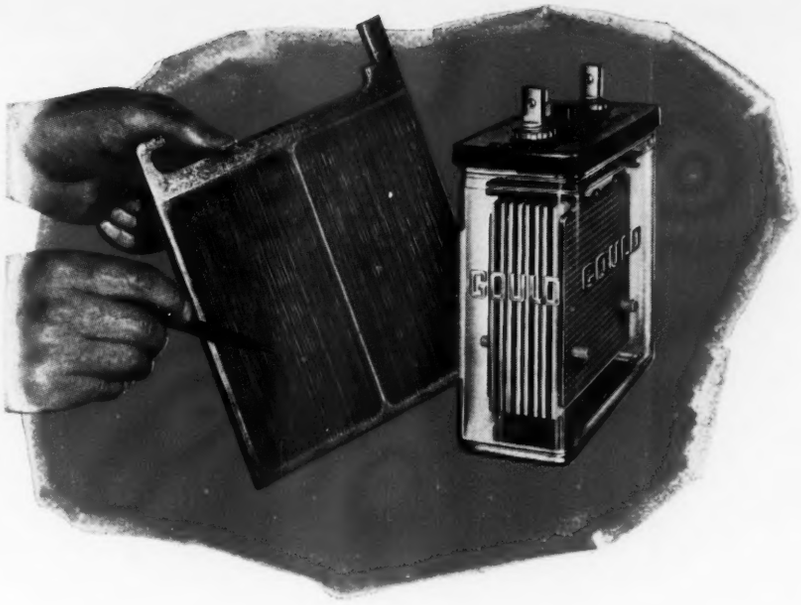
FRONT COVER: The Nation's Capitol, Washington, D. C.

Published monthly by TELEPHONE ENGINEER Publishing Corporation
7720 Sheridan Road - Phone Rogers Park 4-3040 - Chicago 26, Illinois

West Coast Representatives, BRAND & BRAND
1052 West 6th Street, Los Angeles, California

Copyright 1950 by Telephone Engineer Publ. Corp.

VOLUME 54, NUMBER 5. Published monthly by Telephone Engineer Publishing Corporation. Office of Publication, Pontiac, Illinois. Executive and Editorial Office, 7720 Sheridan Road, Chicago, Illinois. Subscriptions: U. S., Cuba, Mexico, $2.00 per year; Canada $2.50; in all other countries, $4.00. Single copies, U.S.A. 20 cents. Entered as second class matter at the post office at Pontiac, Illinois, under the act of March 3, 1879.



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"Per annum cost is lowest. We can amortize them over many more years."

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"They discharge at high rate, longer . . . float at same voltage all their life."

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REA Allocates Loan To Iowa Telephone Co-op

Allocation by the Rural Electrification Administration of $93,000 for a rural telephone loan to the Iowa Falls Rural Telephone Cooperative of Iowa Falls, Iowa, was announced April 20 by the U. S. Department of Agriculture. The funds will be used to provide improved area-wide telephone service in the combined area of 10 existing small mutual telephone companies.

The Iowa Falls Rural Telephone Cooperative is essentially a combination of existing mutual telephone companies to furnish expanded and modernized telephone service that the companies individually could not provide. The 10 mutual companies at present serve about 300 subscribers mostly over one-wire grounded circuits, with more than 10 parties on many lines. The companies own no exchange facilities but obtain switching service from the Northwestern Bell Telephone Company at Iowa Falls. With the prospective conversion of the Iowa Falls system to dial, the mutual subscribers faced the necessity of rehabilitating their lines if they were to continue to receive telephone service.

The companies have no reserves for this purpose, and the members elected to merge them into one cooperative to obtain the necessary financing for area coverage service. The loan will make it possible for the new cooperative to install a dial switchboard, acquire the existing mutual company properties, rebuild and rehabilitate 135 miles of existing line, and construct 27 miles of new lines and 8.6 miles of cable to serve new subscribers. In addition to the REA loan, capital for these purposes will consist of membership fees of $10 per subscriber, and capital contributions of $25 per subscriber, for which proper credit will be issued to members.

This system is expected to provide telephone service ultimately to about 500 subscribers. The cooperative now has 330 members and anticipates having 440 by the time its new facilities are ready to use. The approximately 60 other rural establishments in the area will be able to receive service on application. The cooperative plans to obtain long distance service through

(*Please turn to page* 8)

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Weatherproof Braided Drop and Bridle
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Milltown, New Jersey Telephone: Milltown 8-0030

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CHISEL TIPPED
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a Bell System connection at Iowa Falls.

The territory of the cooperative is a feed grain and livestock area north of Iowa Falls. Farms average 167 acres, and rank high in productivity. Farm electrification is nearly complete in the area, and nearly all farms are on all-weather roads.

The loan will be for 35 years, with interest at 2 percent. The cooperative will give a first mortgage on all property—existing and new—as security for the REA loan.

REA Approves Loan To Utah Telephone Co-op

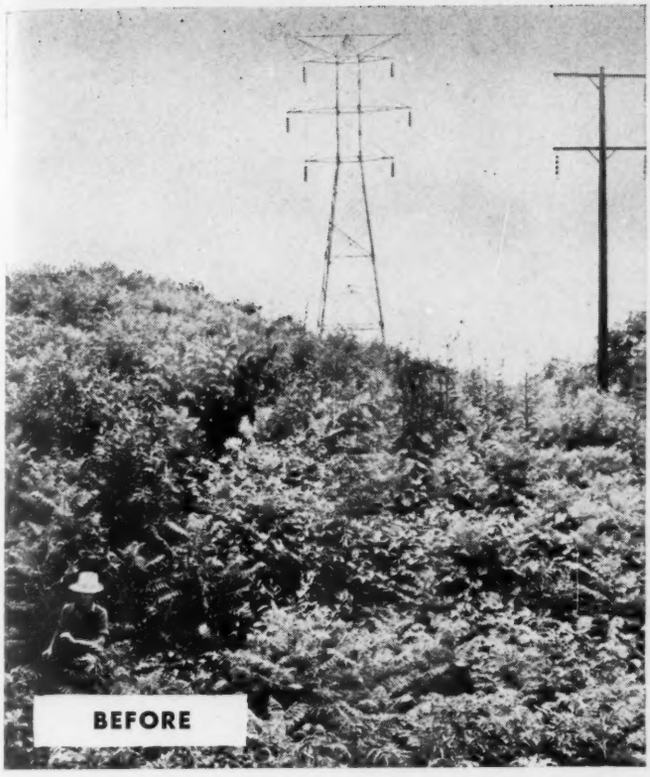
Allocation of $222,000 for a rural telephone loan to the Emery County Farmers Union Telephone Cooperative of Orangeville, Utah, was announced April 19 by the Department of Agriculture.

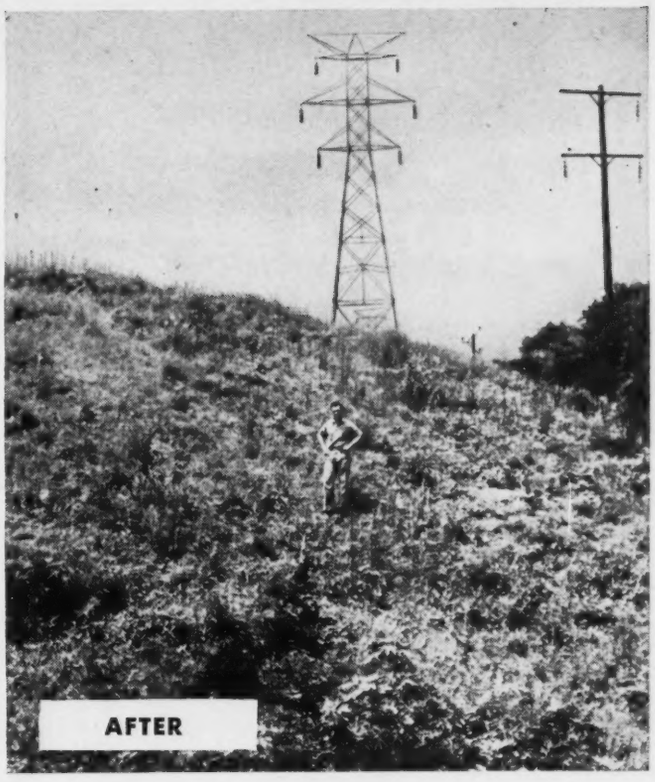
The allocation is the first to a cooperative under the rural telephone program administered by the Rural Electrification Administration. The previous four allocations have been to commercial telephone companies. This allocation provides for establishment of a new area coverage telephone system in an agricultural valley in east central Utah that is now virtually without telephone service.

The Cooperative will construct a complete dial telephone system, including four central office units, 177 miles of pole line, and a headquarters office building at Orangeville. Capital will consist of the REA loan, membership fees of $30 per subscriber, and special capital contributions from coal mines in the area to offset excess construction costs for private line service to these industrial subscribers.

Through this system, the cooperative expects to make telephone service available to every rural establishment desiring service in the area. Of the total of about 1,200 establishments in the service area, the local organizing committee anticipates that about 1,000 will ultimately request service. Of these, 400 have already joined the cooperative. Four hundred more are expected to have become members by the time the facilities are ready for use. Service to these 800 subscribers is contemplated initially.

The loan will be for 35 years with interest at 2 percent. The cooperative will give a first mortgage on all property as security for the loan. The anticipated revenue provides assurance of continued adequate service and funds sufficient to meet all obligations, including repayment of the Government loan with interest.





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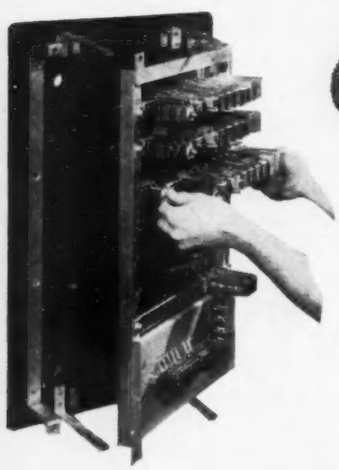

Strip of trunk relays are easily plugged into Relay Equipment Cabinet for use when needed.

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6-2-10 System provides for 6 trunks to the telephone exchange, and 2 inter-communication circuits for 10 local telephones.

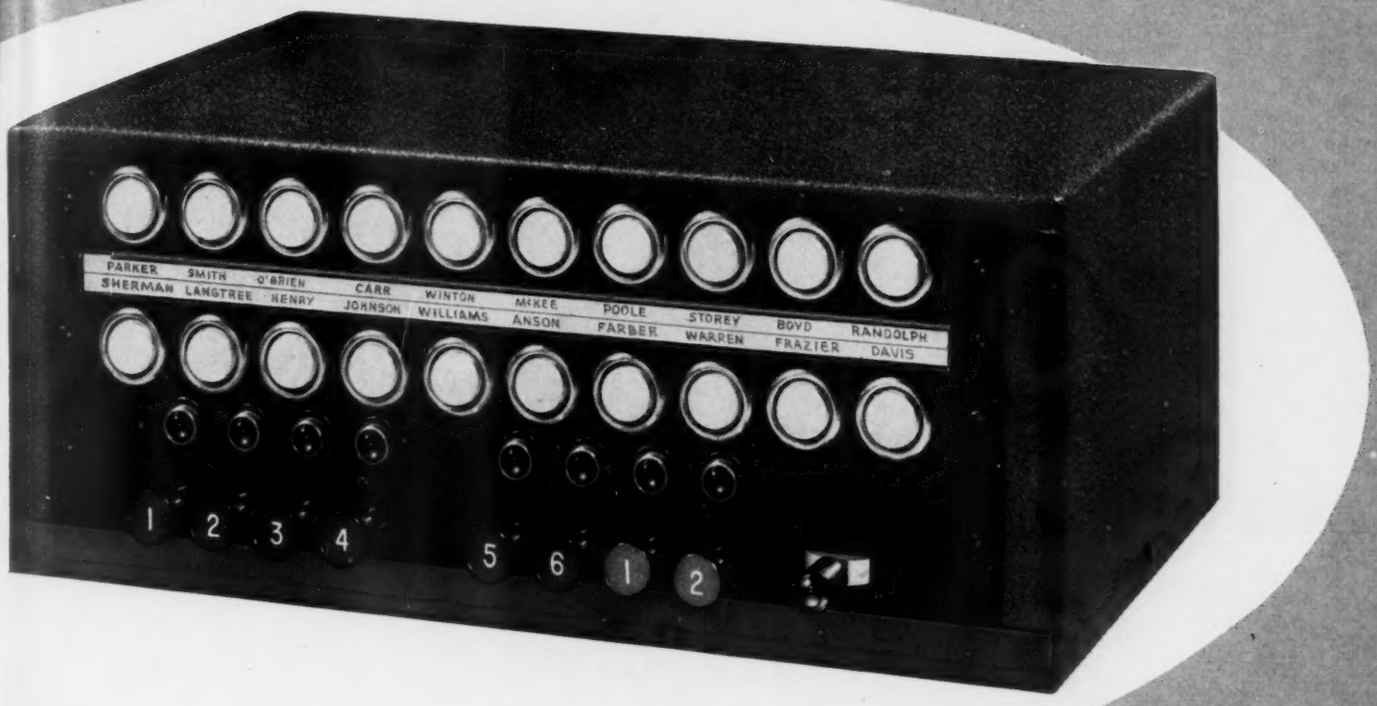
3-1-10 System provides for 3 trunks to the telephone exchange, and 1 inter-communication circuits for 10 local telephones.

2-2-10 System provides for 2 trunks to the telephone exchange, and 2 inter-communication circuits for 10 local telephones.

(All Systems may be used with either common battery manual or dial main exchange.)

In your program for the year you probably have definite plans for controlling expenses while at the same time bringing in extra exchange revenue. Kellogg's Key-BX Systems provide that means to boost income and at the same time to get the benefits of low maintenance equipment.

With Kellogg Key-BX Systems operating on a rental basis in stores, offices . . . every line of business in your area . . . your exchange revenue will climb without adding to your maintenance worries. If you'll point out these many advantages of Kellogg Key-BX to prospects, you'll find selling easy:


PARKER SMITH O'BRIEN CARR WINTON McKEE POOLE STOREY BOYD RANDOLPH
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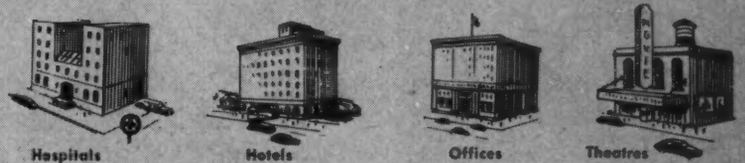
Kellogg Key-BX is adaptable to the needs of any customer for more efficient, time-saving telephone service. No special operator is required as each individual is his own attendant. All incoming and outgoing calls are available to each person. Conference or person-to-person calls between persons inside or outside the system can be handled quickly. And, Kellogg Key-BX is economical, easily installed and requires little maintenance.

Take advantage of the extra profit possibilities offered by Kellogg Key-BX Systems. Ask your Kellogg Representative or write direct for complete information.

See These Important Prospects Now . . .
They Need Kellogg Key-BX Service Today



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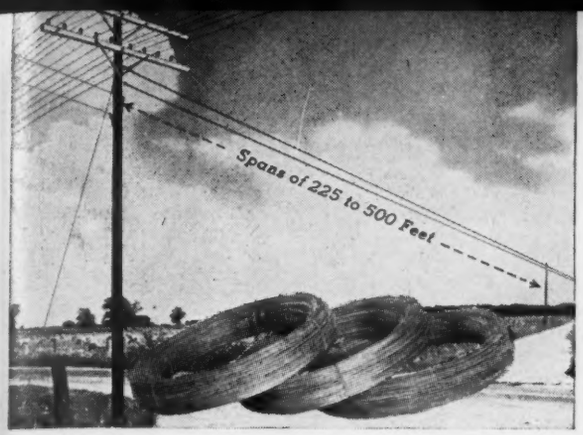
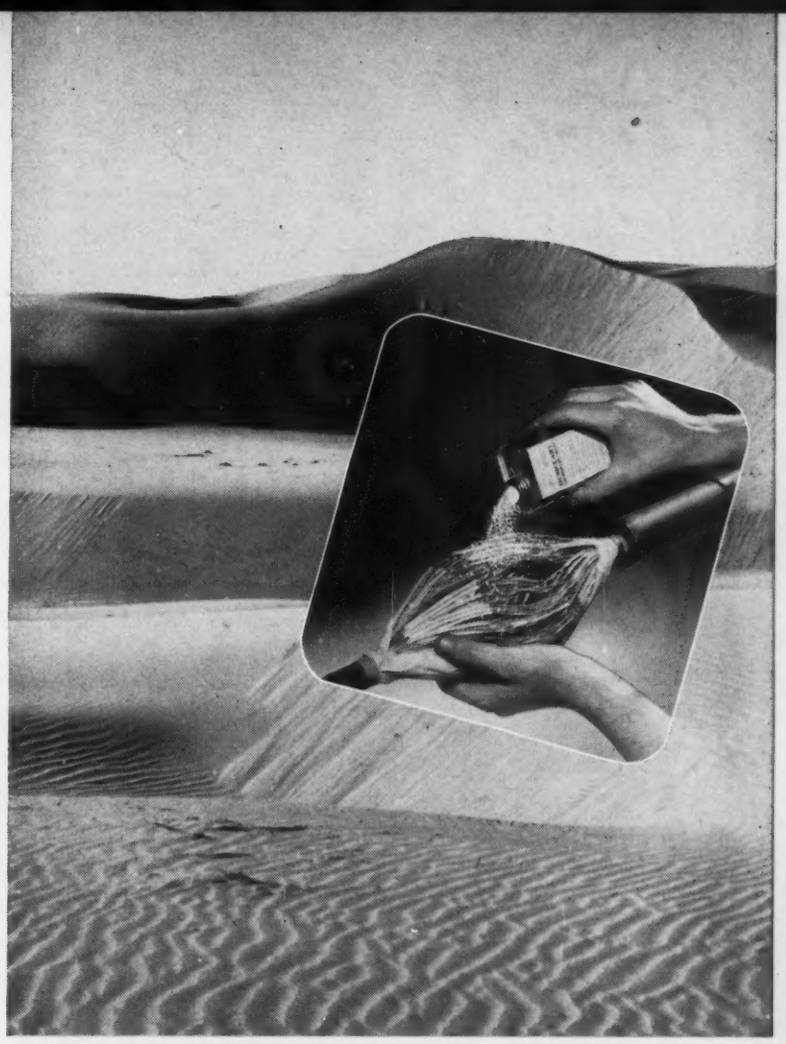


Save Two Ways . . . on materials and maintenance, with INDIANA STEEL & WIRE CO.'S Crapo HTL-85 and HTL-135 Line Wire. Galvanized by the famous Crapo Process, it's protected with a heavy, ductile coating of zinc.

"Attention the Universe: by Kingdoms, right wheel"! With these words, Samuel Morse clicked off the first telegram, Jan. 24, 1838. Since early days, Hemingray Insulators have served communications. Today, made by AMERICAN STRUCTURAL PRODUCTS CO., they're standard for quality.



Drier Than the Driest Desert! Drierite Desiccant is the safer way to dry out splices in lead covered cables. After splicing, just place a cotton gauze under the splice and sprinkle Drierite granules among the conductors. This W. A. HAMMOND DRIERITE CO. product absorbs all moisture, thus making the splice the driest part of the entire cable.

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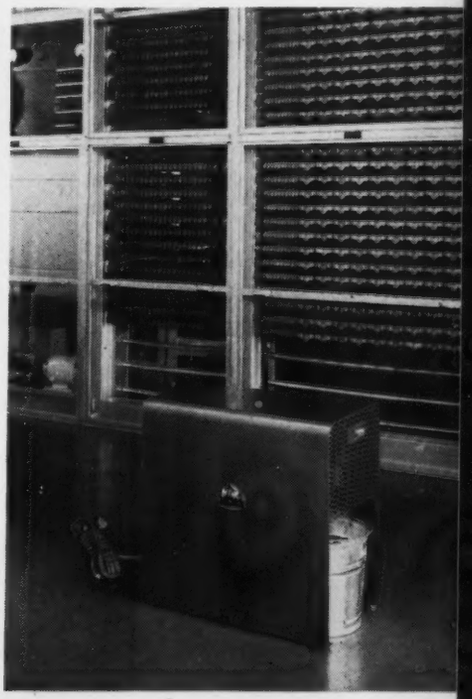
Substantial Power Savings assured by this constant voltage battery charger. 4 Flotrol Chargers consume less standby power than 1 rotating type. Saves on installation and maintenance. Maintains close voltage regulation under heavy load. Made by LORAIN PRODUCTS CORP.



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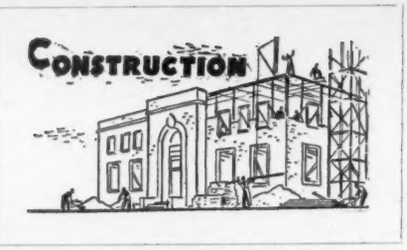

BELLEVUE, IA.—The Iowa State Telephone Co. will begin rebuilding its rural lines leading from the Bellevue exchange this spring, according to a statement by manager, Richard Gaylor.

The entire out-of-city system, comprising approximately 250 miles of wires, poles, etc., on the 25 rural lines connected to the local switchboard, are included in the rebuilding plans and the job will require over a year's time.

COLUMBUS JUNCTION, IA.—Practical completion of an extensive $110,000 rebuilding program in this area was announced recently by the Iowa-Illinois Telephone Co.

During the past two years all farm lines have been rebuilt and placed on metallic circuits with the exception of line 57, completion of which is waiting on the construction of a new road along the lines. The improvements also include a new cable line to Columbus City.

ALLENDALE, MICH.—The Allendale Telephone Co. has recently completed an expansion program, including new cable and several new lines at a cost of approximately $7,000, it was announced at the annual meeting of the stockholders of the company.

Two new directors were named to replace Justin E. Wolbrink who has served as president and manager, and Gerrit Potgeter, both of whom had requested to be relieved from their duties as directors. The new members are John H. Gemmen and Abe Van Timmeran. Other members of the board are: Carl Haverman, John G. DeJonge, John Van Huizen, Jr., Morris Hinken and Peter Mulder.

BLOOMFIELD, MO.—An automatic telephone system will be installed at Bloomfield this year, according to Tate Gillis of Poplar Bluff, assistant to the general manager of Southeast Missouri Telephone Co. A new building will be erected to house the new equipment.

Bloomfield at present has 280 lines in town and 16 farm lines, 40 of the town lines being party lines. New rural lines will be erected by the company if the demand arises.

NEWSLETTER
TELEPHONE ENGINEER

Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND *Management*

ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH

NEWSLETTERS *on Alternate Weeks*

May 15, 1950

Dear Sir:

Allocation recommendations for 7 more farm telephone loans are either prepared or in preparation, in readiness for final action by Agriculture Department Solicitor & Rural Electrification Administrator Claude R. Wickard, it was reported recently. Indicating considerable progress by REA in acting on mass of loan applications despite its thus-far restricted personnel, Applications & Loans & Engineering Divisions have completed field studies of 12 more applicants' properties. In another 9 cases, field study has been concluded. It is explained by REA sources that engineering field studies are made whenever applicant group has existing property, unless REA decides existing property is so inconsequential it would not be usable as loan equity.

In addition, it is reported, REA has 31 other field studies under way, with 9 more scheduled. Thus, of 418 applications received under latest count, 74 either have been approved or reached field study stage. Of remaining 344, preliminary review at REA headquarters has been completed or is being made in 275 cases. Field studies begin after preliminary review, unless it is found that additional information is needed. REA said that thus far 6 of every 7 loan applications have required additional data, & currently 230 of applicants have been asked to supply further particulars. Major difficulty has been regarding maps submitted with loans. Map requirements include proviso that every rural establishment in area be shown, with indication as to whether service will be available. Another requirement is that exchange boundaries & nearest boundaries of adjoining telephone exchanges be accurately shown.

* * *

R. D. Pontius, general manager, Rochester (Ind.) Tel Co., was elected president of Indiana Telephone Assn. at recent Indiana convention. R. E. Brookbank, mgr., Pendleton Tel. Co., named vice pres.; C. E. McCormick, vice pres., Citizens Independent Tel. Co., second vice pres.; W. H. Beck, sec.-treas.

* * *

A small Independent telephone company, Mosinee (Wis.) Tel. Co., with around 300 subscribers, had its exchange office siezed by mock communists in widely-publicized May Day demonstration raid.

* * *

Hearings on Bell Telephone Laboratories' proposed broadband system for mobile radiotelephone services in 470-500 megacycle band, which will launch the next phase of the FCC's overall television sessions, will begin

June 5. In addition to Laboratories, number of parties are slated to appear, including National Mobile Radio System, U. S. Independent Telephone Assn., & Mutual Telephone Co. of Hawaii.

* * *

Here's switch -- town of Tipton, Mo., says it's all right for United Tel. Co. to increase its rates. In fact, mayor wrote Missouri State Public Service Commission, & said service is so much better since company rebuilt its system, he figures rate increase is justified. Lions' club & Chamber of Commerce agreed. Commission went along, gave company authority to start charging higher rates.

* * *

Dr. Howard M. Trueblood, retired assistant director of transmission engineering of Bell Telephone Laboratories, reported for duty with the REA May 8 as consultant to technical standards division. Dr. Trueblood, who also is consultant to National Military Establishment Research & Development Board, serving as chairman of panel on Interference of Electronics Committee, will study in his part-time REA service such questions as joint use of poles, carrier systems, preparation of technical material for field, protection from lightning, & corrosion.

* * *

Highlights: Michigan Associated Tel. Co. completed conversion of Hesperia, Mich. to automatic operation....L. L. Porter, Texarkana, Ark., appointed dist. mgr., Two States Tel. Co....Gulf States Tel. Co. cut Athens, Tex. to automatic operation....Mrs Alva Keeley retired as chief operator, Southeast Mo. Tel. Co., Camppbell, Mo....Ozark Tel. Co. completed installation of automatic service at Tuscumbia, Mo....J. D. Wilson, Greenville, Tenn., appointed Kingsport dist. mgr., Inter-Mountain Tel. Co.

United Tel. Co. installing common battery system, Mound City, Mo.... 54 year old Pryor (Okla.) Tel. Co. held open house....Willard Isaacs, Forty Fort, Pa., named dist. mgr. Luzerne Tel Co., Shickshinny, Pa.; succeeds O. C. Cotterman, retiring after 48 years service in telephone industry....Platte Valley Tel. Co. will convert Morrill, Neb., to common battery operations....Sargent County Tel. Co., Rutland, N. D., requested authority to discontinue its exchange....Gleeman Long, mgr., Sterling (Kans.) Tel. Co. elected pres. Sterling Chamber of Commerce....At recent annual meeting of Texas Chapter of Independent Telephone Pioneer Assn., motion was made & seconded & duly passed that Texas Chapter should increase its Board of Directors by 4, making total of 11. In an effort to get representation in various parts of state, following have been selected & confirmed by existing Board of Directors: Oscar Burton, Tyler; Dink Robb, Electra; T. A. Singer, Dimmitt; C. W. Hughes, Houston.

Died: Mrs. Velma Drennen Townsend, Arrow Rock, Mo.; charter member, Theodore Gary Chapter, Independent Telephone Pioneer Association.

Ray Smith

Ray W. Smith, Editor

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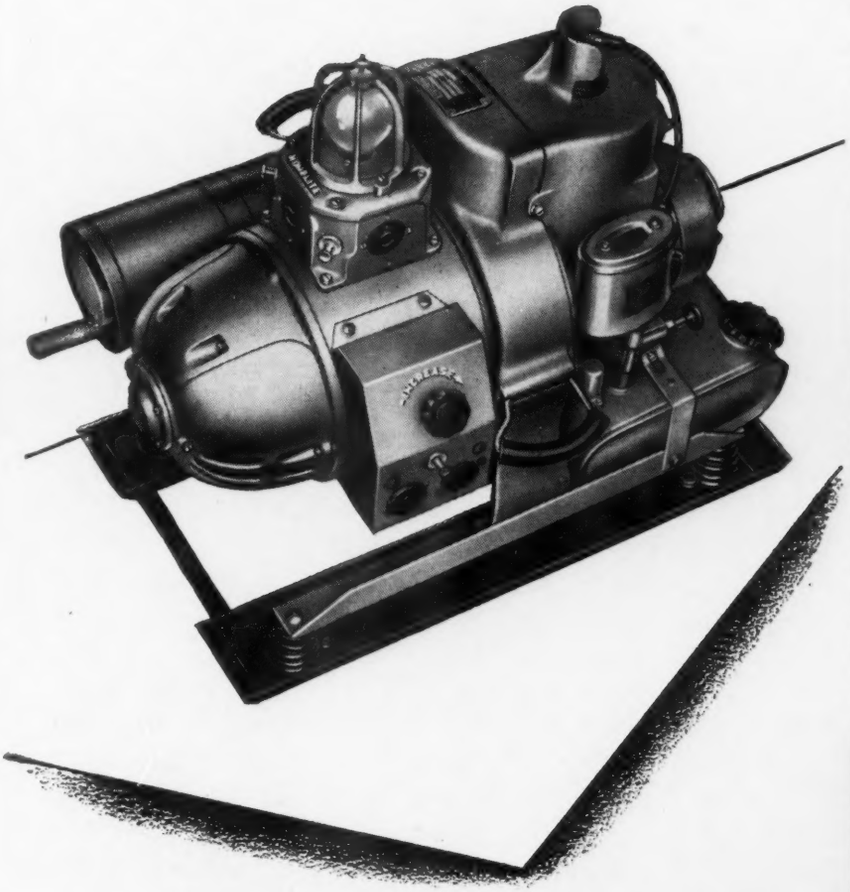

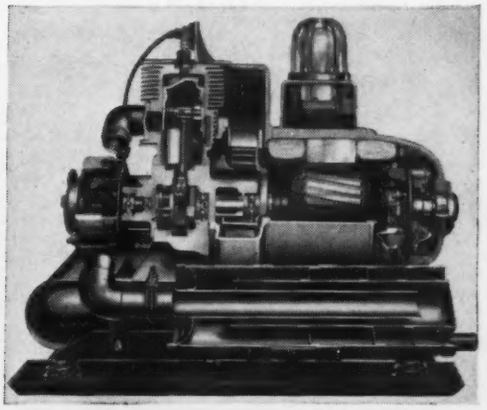

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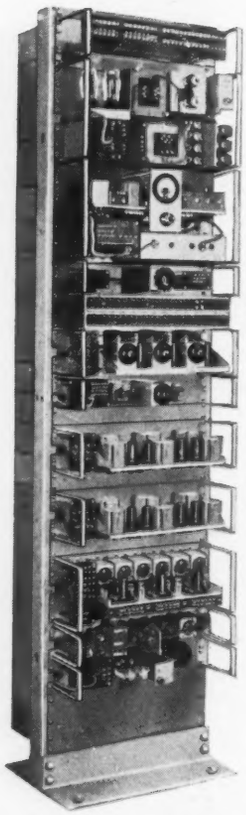

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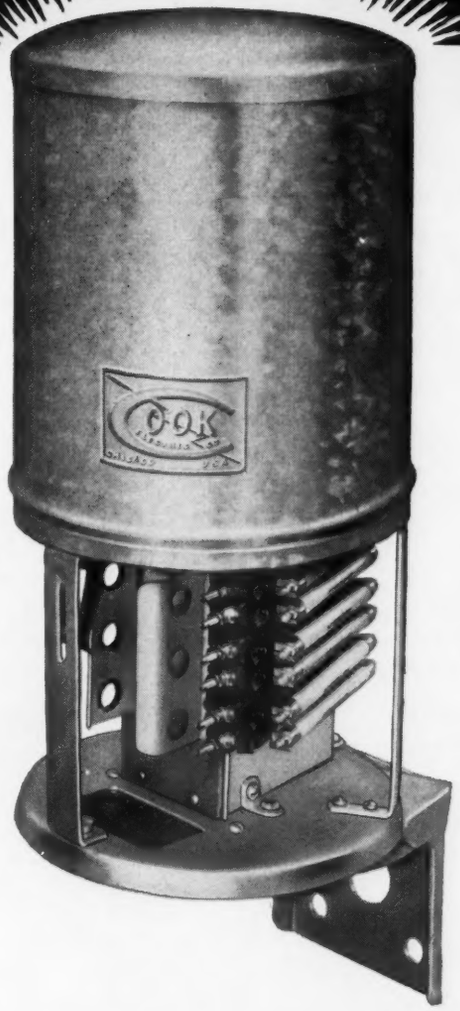

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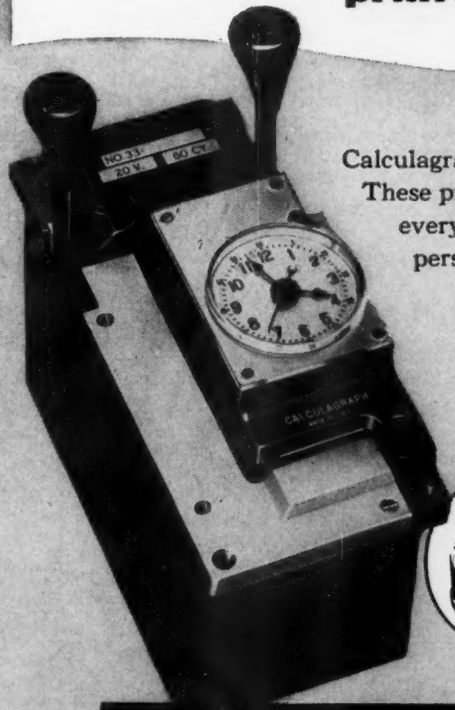

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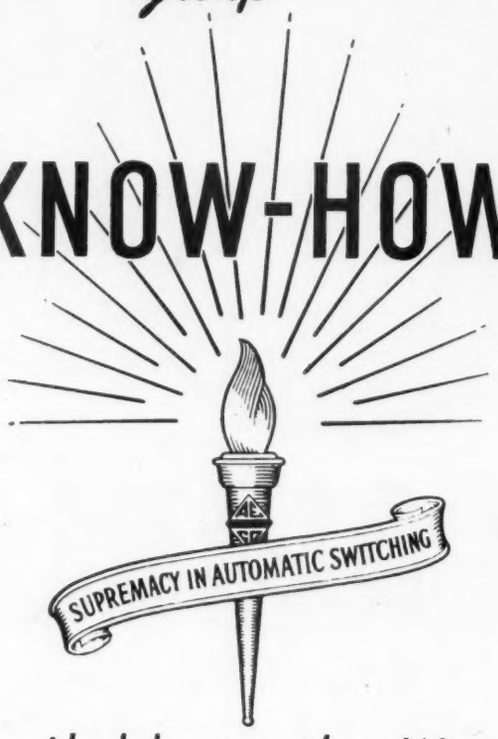

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EDITORIAL

The Telephone Company Made A Million Dollars

NOT LONG ago, in a city which is headquarters of one of the larger Independent telephone companies, we heard on our traveling radio a broadcast by a local commentator. This gentleman was telling the news of the city and, amongst other things, he said: "The local telephone company, which raised its rates only a few months ago, made a profit of almost a million dollars last year—the highest profit in the company's history."

He said this somewhat accusingly, and we have no doubt that many if not most of the people who heard it got the impression that the telephone company was gouging the public handsomely.

All that this broadcaster said was quite true, as is shown by the company's published statements. But the trouble with the comment was that it was not all of the truth.

The broadcaster did not explain that—as is also shown by the company's published statements—the telephone company has a fixed investment of nearly twenty-five million dollars, and that its profit of almost a million dollars was only about four percent on that investment.

He did not explain that, in order to keep up with the demands of the public for telephone service, the company had had to invest nearly nine hundred thousand additional dollars in plant and equipment, during the year in question. Naturally its profits for that year were higher than they had been before—it had a much larger investment upon which it had to earn.

He did not explain that practically all of the additional revenue from the increase of exchange rates went for higher wages and for more taxes to Uncle Sam.

Nor did he explain that, on the very day he made his comment, the telephone company officials were in negotiation for an additional one and one-half million dollars of financing, with which to buy and install new and additional equipment and plant to take care of the seemingly never-ending demand by the public for more telephone service—upon which additional financing the company would have to make an earning if it is to stay solvent and to continue supplying good telephone service to its territory.

In incidents such as this—cases where the public is given only a part, and the sensational part, of the truth—there lies, we think, much of the public feeling that exists in some places against utility companies. It is that type of public feeling that often prevents the utility from charging rates for its service that will allow it to provide the public with the high grade of utility service the public really wants.

On the whole the American public is fair-minded, and it wants and expects business to make a fair and reasonable profit—which business must make if it is to continue in business. But the public will not stand for being gouged.

Telephone managements cannot expect the radio, press and other disseminators of information to tell their story for them the way they would like it told—i.e., with all the facts taken into consideration. That kind of story is not news. It is not news that the telephone company is doing a good job and making only a fair profit. The story becomes news only when there is something sensational in it, such as the implication that the public is being gouged.

The press and radio are usually fair when given the facts. As to telephone matters, the only people who can give them the facts correctly and fully are the telephone companies themselves.

The telephone industry in this country did a good job during the war and has done a good job since the war. Millions upon millions of additional dollars have been poured into new plant and equipment since the war, the service has been greatly improved, and increases of rates for telephones have been much smaller than rises in prices of most other things. The industry really has a story that is deserving of publicity. But that story will never be told, fully and with due and proper credit to the industry, unless the industry itself tells it. . . .

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1900-Watch the Birdie!
1950-Stop the Action!

DIAL SYSTEMS, TOO, HAVE GROWN UP

The objective of a photographer is the same today as it was fifty years ago—to perpetuate on film a moment of life. But how much more easily and more successfully the 1950 camera enthusiast pursues his hobby than his grandfather did. Cameras of yesterday are collectors' prizes—but you'd hardly buy one for actual use today.

Neither would you buy a dial system of yesteryear! You'd ask the question, "Who makes the *best* system today?" In the past two years, well over 100 telephone exchanges have studied the market from that viewpoint and have picked Stromberg-Carlson "XY"—the system that is *soundest* in principle and most *modern** in engineering.

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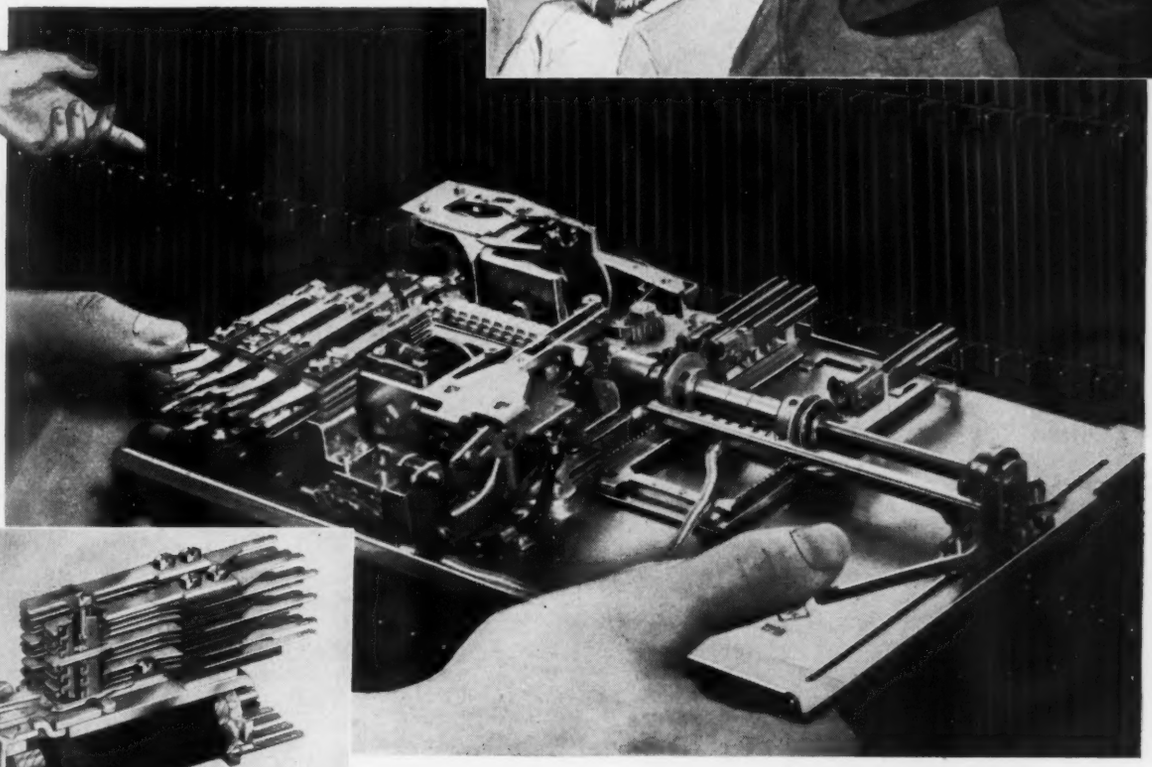

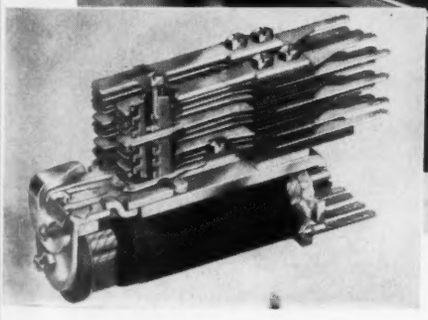

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WASHINGTON BUREAU REPORTS

by Roland Davies and Fred Henck

PUBLIC SHOULD be told how much it pays in excise taxes on telephone service . . . REA gets $25 million loan fund for fiscal year starting July 1. House appropriations committee trims fund request in half.

WHEN A TELEPHONE company gets a franchise to operate as a public utility in a given area, apparently another license is issued—one to legislators to use it as an unpaid tax collector, target for attacks on business, and whipping boy because it happens to offer its services to handle communications.

The nation's telephone companies have received two recent jolts on Capitol Hill—one which for all intents and purposes puts their services in the "luxury" class and will in addition cost many companies an outlay in dollars and cents with absolutely no return on the expense, and another which at least was unfortunate from the public relations viewpoint.

First came the action of the House Ways and Means Committee, in tentative approval of a slate of excise reductions which call for a 20% levy on long-distance telephone service, instead of the present 25%, and 10% on local residential and short-haul toll service. The present 15% levy on local service would remain insofar as business service is concerned.

Second was the hearing before the Senate Interstate and Foreign Commerce communications subcommittee, now investigating the use of communications for book-making purposes, in which the nation's telephone companies were in effect charged with "aiding and abetting" gambling despite their spokesmen's careful explanations of the legal positions of the companies and their inability to refuse or disconnect service arbitrarily without due notice from law enforcement authorities.

On the theory that anything is better than nothing, a 5% cut in residential service excises is not to be disregarded as worthless. But already it is being pointed out that many companies will have to put on extra employees in their accounting departments to segregate business and residential subscribers for excise purposes. Since the companies act as tax collectors for the federal government without reimbursement, it might be said that this extra cost would be worthwhile only if a more noticeable slash in the local residential excises had been proposed—one that would show up more clearly in subscribers' telephone bills.

Long-distance service, of course, is being taxed at the highest single excise rate imposed. A few other services currently carry the 25% rate, but none goes higher. At 20%, long-distance service would be virtually in a class by itself, particularly since the committee has approved reductions in the taxes on various commodities usually considered luxuries to rates around 10%.

The reason for the committee's action, of course, remains obvious—telephone excises bring in too much money at a time when the federal government is piling up a bigger national debt all the time.

This column recently conducted an informal poll among Washington newspapermen having lunch at the large "round table" at the National Press Club, asking which class of excises (communications, transportation, gasoline, or retail) they thought brought in the largest amount of revenues after the three leading items—liquor, beer, and cigarettes. Most of the answers either were gasoline or transportation. Not one gave the right answer—communications. And, of course, local telephone service accounts for about half that amount. It is certain the public does not realize how much it pays in telephone services taxes—and many members might be interested in knowing before the excise reduction measure goes through the Senate.

Gambling Probe

ON THE SUBJECT of the gambling probe, the telephone companies have indicated their opposition to portions of a bill proposed by the Attorney General's Law Enforcement Conference which in effect would require them to monitor all telephone calls to be certain they were not violating the statute. The

bill, in making the transmission of "gambling information" illegal, would assess no penalties on the senders of the information, but instead on the communications companies transmitting the data.

Although virtually all the law enforcement and public officials who have appeared before the subcommittee praised the nation's telephone companies for their cooperation in discontinuing service at the request of authorities, Senator Estes Kefauver (D., Tenn.), author of a resolution for a general crime study by the Senate, went so far as to contend that the companies should analyze all their subscribers' bills and report suspicious circumstances to the authorities. Such suspicious circumstances would include, for example, a large number of calls from a given point near a race track during the racing season, with little or no traffic at other times.

Since various witnesses have pointed out that the real villain in the gambling picture is the citizen who bets on the third at Narragansett with his bookie, and others have emphasized that efficient local law enforcement and an aroused citizenry could stamp out the gambling evil, a few Senators apparently feel that the "buck can be passed" to the communications companies to censor communications traffic and thus halt the interstate exchange of information and bets.

This would affect all telephone companies, since equally illegal under the bill are race results and information intended for illegal purposes, and calls placing bets or aiding and facilitating gambling pursuits.

Senator Charles W. Tobey (R., N. H.) insisted during the appearance of Executive Vice President Clyde S. Bailey of the U. S. Independent Telephone Association that the companies should willy-nilly pull out the service of known gamblers or bookmakers, despite Mr. Bailey's point that the companies must live within the nondiscrimination provisions of state regulatory laws and that they can hardly discontinue or refuse service without proper authority.

Mr. Bailey in his statement laid stress on the view that "Such a responsibility as that which the pending bill would impose upon telephone companies would deprive the public of a dependable, private telephone service and could easily become the first step toward an effective communication censorship.

"When we reach the point in the administration of our police or criminal laws where the duties of duly constituted law enforcement agencies must be assigned to private enterprise in order to accomplish enforcement, we have indeed come to an unfortunate stage in our national life, and opened the door to a most serious violation of private rights and liberties."

He noted that "Under the broad terms of the bill, if the facilities of a telephone company were even used in transmitting over the telephone a gambling message in code, which no one but the gamblers would understand, telephone companies would be guilty of violating the law in permitting such use.

"In order to be sure that no calls get by which are within the condemnation of the bill, and thus protect ourselves against the penalties of the law, it would be necessary for us to monitor all calls, regardless of their intimacy and privacy, and regardless of whether they related to gambling or not, and even regardless of important considerations of national defense.

"An anomaly of this situation is that the monitoring that would be required to produce immunity from the penalties of the law could not, as a practical matter, be done. It would involve the employment of a whole army of employees doing nothing else."

He emphasized, "Telephone companies are not schooled in the art of crime detection. That is not their business. They are schooled in the art of speeding the messages of mankind, not listening to them."

In their opposition to the bill in its present form, the telephone companies have the support of the Federal Communications Commission. FCC Chairman Wayne Coy has strongly opposed the bill as putting too much of a burden on the companies and the Commission. His substitute was not wholly endorsed by Mr. Bailey, who noted that, while it would impose penalties on the senders of gambling data, it also would penalize companies which "knowingly" transmit the information for such purposes. He asked if transmission could be considered within the knowledge of a telephone company if a repairman visited the premises of a subscriber and had opportunity to note suspicious circumstances, but did not in fact see them.

Coming Conventions

Kansas Telephone Association, Jayhawk Hotel, Topeka, May 16 *and* 17.

Wisconsin State Telephone Association, Park Hotel, Madison, May 16 *and* 17.

New York State Telephone Association, Seneca Hotel, Rochester, May 24 *and* 25.

California Independent Telephone Association, Biltmore Hotel, Los Angeles, June 1 *and* 2.

Oregon & Washington Independent Telephone Associations, (Joint Meeting), Davenport Hotel, Spokane, Wash., June 9 *and* 10.

North Dakota Telephone Association, Gardner Hotel, Fargo, North Dakota, June 15, 16.

Michigan Independent Telephone Association, Olds Hotel, Lansing, Sept. 14 *and* 15.

Rocky Mountain Telephone Association, Newhouse Hotel, Salt Lake City, Utah, Sept. 21 *and* 22.

United States Independent Telephone Association, Hotel Stevens, Chicago, Oct. 9, 10, *and* 11.

North Carolina Independent Telephone Association, Carolina Inn, Pinehurst, N. C., Oct. 16-17.

Georgia Telephone Association, Henry Grady Hotel, Atlanta, Nov 6 *and* 7.

Rural Telephone

THE $25 MILLION loan authorization for the Rural Electrification Administration's farm telephone program for the fiscal year starting July 1, and its $900,000 administrative fund for telephone work, have been approved by the House of Representatives with no effort to raise the amount provided and little criticism of the decision by the House Appropriations Committee to trim the loan funds in half.

Although Rep. Jamie L. Whitten (D., Miss.), managing the Agriculture phase of the appropriations measure on the House floor, indicated that the REA could allocate some of its electrification personnel to farm telephone work if necessary, since there is no separation of administrative funds in the measure, this is deemed unlikely by REA sources.

It was pointed out that the agency received a supplemental appropriation in the current fiscal year for elec-

(*Please turn to page* 53)

Rebuilding The Rural Outside Plant

Part III of Mr. Reed's article discusses cost studies and standard items of outside plant material. (Part II of this article appeared in the May Fortnightly Telephone Engineer.)

FOLLOWING THE inspection of the outside plant, a study is made to determine the probable cost of rebuilding the outside plant. The basic sources of information for making this determination are the inspector's detail sheets, suppliers' catalogs of material with price lists, and labor time-unit tables.

The items of material required are taken from the detail sheets and totaled, to obtain the quantities to be ordered from the suppliers and the total cost. Representatives of several telephone supply houses should be consulted to give them an opportunity to compete for the order, as well as to obtain advice on items to be purchased and the quantity discounts available. A suggested list of outside plant materials will be found elsewhere in this series.

The probable labor cost is obtained by consulting time unit tables (*Tables Nos.* 1 *to* 3). These tables indicate the time required to remove, transfer, or place items of materials. The quantity times the total labor time for the item in question gives the total labor time for installing that item. The total labor time is multiplied by the hourly wage rate in the area to obtain the total labor cost.

The probable expense of the rebuilding project is the sum of the material and labor costs. This item added to the town plant repair and replacement and the central office rebuilding costs determines the total outlay for the entire company project and is the basis for determining the subscriber rates that should be requested in order to obtain a fair return on the investment plus a reasonable reserve for depreciation of the plant and equipment.

To reduce the labor cost, the small company can enlist the cooperation of the farmers in the community in rebuilding the plant. Considerable time and expense of placing the poles can be saved by using mechanical farm post-hole diggers similar to the larger earth-boring equipment used by large telephone companies.

In the long run it is always economical to utilize standard

Table I. Outside Plant Time Units — Poles

	Hours Per Unit								
	Digging		Removing Poles			Setting			Straightening
Pole Sizes	Pole *Holes	Setting Poles	Recovered as: Good	Worthless	Resetting Poles**	Deeper	Moving Poles	Poles 1 to 5	Classes 6 to 10
16	0.6	0.8	0.5	0.2	0.5	—	0.8	1.3	0.7
20	0.7	1.2	0.6	0.3	0.7	1.0	1.2	1.3	0.7
25	0.9	1.8	0.8	0.4	1.0	1.0	1.8	1.3	0.7
30	1.1	2.4	1.1	0.6	1.5	2.0	2.4	1.3	0.7
35	1.3	3.0	1.5	0.8	2.0	2.0	3.0	1.3	0.7
40	1.6	3.6	2.0	1.2	2.5	—	3.6	1.3	0.7
45	2.0	4.2	2.2	1.4	3.0	—	—	1.3	—
50	2.4	5.0	3.0	2.	3.5	—	—	1.3	—

*Hand digging. **Does not include digging time.

Table II. Outside Plant Time Units — Pole Line Fixtures

Item	Hours per Unit		
	Installing	Transferring	Removing
Anchor, 4" and 5"	0.5	—	3.0
" 7" and 8"	0.9	—	3.0
" 8" x 25" plate	2.0	—	3.0
" 8" x 33" plate	2.8	—	3.0
" Log	10.0	—	3.0
Bracket, Wood Pole	0.06	—	0.02
Crossarm, Single	0.3	0.3	0.2
" Single, Lower	—	0.3	—
" " Straighten	—	0.2	—
" Double	1.0	0.6	0.4
Guy, Anchor, 203 Galv. Wire	0.4	0.4	0.2
" " 2200# Galv. Strand	0.4	0.4	0.2
" " 6000# " "	0.6	0.6	0.2
" " 10000# " "	1.0	0.8	0.3
" " 16000# " "	1.4	1.0	0.3
" " Pulling Slack in	—	0.3	—
Guy, Overhead, 203 Galv. Wire	0.6	0.6	0.3
" " 2200# Galv. Strand	0.6	0.6	0.3
" " 6000# " "	0.8	0.8	0.3
" " 10000# " "	1.2	1.0	0.5
" " 16000# " "	2.0	1.2	0.5
Guy, Overhead, Pulling Slack in	—	0.5	—
Guy Guard	0.2	—	—
Guy Insulator	0.2	—	—

Table III. Outside Plant Time Units — Aerial Wire and Drops

	Hours per Unit		
	Installing	Transferring	Removing
Steel Line Wire	5.0	1.5*	2.0
Copper Wire	5.0	1.5*	2.0
Insulated Wire**	4.0	—	—
Jumpers, Aerial Wire	0.3	0.2	—
Drop Wire***	2.0	0.4	—

*Pulling slack—1.5 hours; replacing insulator—0.3 hour, making line cut—0.5 hour.

**Placing temporarily for rewire during line installation, removal, or transfer and then removing.

***Repairing, rearranging, or rerouting drop—.75 hour each.

items of material in outside plant installations. Such items are listed in telephone jobbers' catalogs and are regularly advertised in telephone trade magazines. Only items that have proved their worth in the experience of many telephone companies are carried year after year in manufacturer and jobbers' stocks. With certain exceptions, it is not advisable to use surplus war materials as substitutes for more durable items since many army and navy supplies are not intended for permanent service. For example, army field wire should not be used in place of standard drop wire since the field wire has an extremely short life.

A list of suggested standard items of outside plant material and their uses is given in *Table* 4.

Tools generally used in line building are listed in *Table* 5. These tools are carried in a light construction truck which contains compartment and racks for carrying the equipment. If the truck is provided with a winch and derrick, the task of placing the poles will be considerably lightened. It is now possible to obtain a standard light-duty truck with these features at a reasonable price.

In addition to the tools carried in the truck, the men will be provided with personal tools such as climbers, body belt and safety strap, and wire cutting and handling tools (8-inch side-cutting pliers, diagonal pliers, and long-nose pliers).

Selection of Poles for Open-Wire Lines

THE KINDS OF poles most commonly used in pole leads are cut from Northern White Cedar, Western Red Cedar, and Southern Yellow Pine. These three tree species account for probably 95 percent of poles filling the requirements of telephone companies. Other species from which telephone poles are also cut are Douglas Fir and Lodgepole Pine.

Cedar poles are very resistant to decay and termite infestation because of toxic materials present in the heartwood which constitutes 90 percent of the wood volume, the rest being sapwood. Since this sapwood is somewhat less toxic than the heartwood, the poles are given a creosote butt treatment to prevent ground line decay. Cedar poles have a service life of from 25 to 35 years, the maximum life being obtained under conditions of freedom from excessive moisture and shade. For maximum protection, cedar poles may be full-length pentachlorophenol treated in addition to being butt-treated. Cedar poles have noticeably more taper than pine poles. The red cedar has a smooth surface while the white cedar has a somewhat more knobby and irregular appearance than the red cedar.

The yellow pine and Douglas fir poles are extremely strong, but owing to a high content of sapwood (almost 80 percent), they require a full-length cresote treatment to obtain the maximum service life of 30 to 35 years.

Untreated poles should never be used as they have a very short life and may become worthless within a few years. Even when poles are cut locally from Chestnut or Cypress which are naturally very resistant to decay organisms and termites, they are not wholly satisfactory.

It is advisable to have the supplier roof, gain, and bore the poles, particularly those requiring full-length treatment, so that the desired number of crossarms can be placed for the ultimate number of lines. This procedure avoids exposing untreated wood to entry by decay organisms and termites. If, however, it is necessary to gain a pole locally as when less than the standard crossarm spacing (24 inches) is required, care should be taken not to remove more wood than necessary in cutting the gains. The hole bored for the crossarm bolt should be afterwards closed tightly with square washers and a crossarm bolt to exclude moisture. The framing dimensions are indicated in Figure 15.

Table 6 lists the classes and weights of poles cut from the three common tree species. Although these species have different fiber strengths (7400 lbs./sq. in. for yellow pine; 5600 lbs./sq. in. for red cedar; and 3600 lbs./sq. in. for white cedar), the butt dimensions are so selected that poles of the same class but different kinds and lengths have the same resisting moment (resistance to breaking at the ground line due to a force applied at the wire load center). Thus a 25-ft. Class 7 pine pole has the same resisting moment as a 35-ft. Class 7 cedar pole. This classification system greatly simplifies the selection of poles of the proper strength for the line under construction. Listed below are the

Table 4—List of Materials Recommended for Use in Rebuilding Rural Outside Plant.

ITEM	USE
Anchors, Pole	
5″—2-way Expanding	With 2,200-lb strand. (Requires one ½″ thimble eye anchor rod.)
8″—2-way or 3-way Expanding	With 6,000-lb. strand. (Requires one ⅝″ thimble eye anchor rod.)
8″x25″ Plate	With 10,000-lb. strand at railroad crossings. (Requires one ¾″ thimble eye anchor rod.)
8″x35″ Plate	With 16,000-lb. strand at railroad crossings. (Requires one 1″ thimble eye anchor rod.)
Creosoted Plank (Two pieces 2″x 12″x24″)	With 2,200-lb. strand. (Requires one ½″ thimble eye anchor rod and one 1¼″x4″ galvanized square washer.)
4″ Screw Type	With 2,200-lb. strand.
10″ Swamp Type	With 6,000-lb. strand in swampy locations. Uses 1½″ steel pipe and pipe eye nut.)
12″ Swamp Type	With 10,000-lb. strand in swampy locations. (Uses 2″ steel pipe and pipe eye nut.)
15″ Swamp Type	With 16,000-lb. strand in swampy locations. (Uses 2″ steel pipe and pipe eye nut.)
Anchor, Hammer Drive	
5/16″x2¼″	Used with drop wire hook on masonry walls.
Anchor, Screw	
10—14x1″	To anchor bridle rings to masonry walls.
Anchor, Screw	
10—14x1½″	To anchor "C" knobs to masonry walls.
Bolts:	
⅜″x4″ Galvanized Carriage	To attach crossarm brace to crossarm.
½″x4½″ Galvanized Machine	To fasten diagonal brace to side arm.
⅝″ Crossarm (10″ to 22″)	To attach crossarm to pole.
⅝″ Double Arm (12″ to 22″)	At ends of a double arm to space and reinforce the arms.
5/16x2″ F.H. Stove	To fasten one "S" knob to house or corner bracket.
5/16x3″ F.H. Stove	To fasten two "S" knobs to house or corner bracket.
3/16″x4″ R.H. Toggle	To fasten "C" knob to hollow tile wall.
¼″x4″ R.H. Toggle	To fasten house or corner bracket, corner bridle ring to hollow tile wall.
5/16″x5″ R.H. Toggle	To fasten "S" knob to hollow tile wall.
Bolts, Thimble Eye:	
¾″ Straight (10″ to 16″)	For attaching 6,000-lb. or 10,000-lb. guy strand to pole when Lead/Height ratio is more than 1¼.
¾″ Bent (10″ to 16″)	For attaching 6,000-lb. or 10,000-lb guy strand to pole when Lead/Height ratio is 1¼ or less.
1″ Straight (12″ to 18″)	For attaching 16,000-lb. guy strand to pole at railroad crossings when Lead/Height ratio is more than 1¼.
1″ Bent (12″ to 18″)	For attaching 16,000-lb. guy strand to pole at railroad crossings when Lead/Height ratio is 1¼ or less.
Braces:	
Back, 5′6″	To reinforce side arm when more than six wires are to be carried.
Crossarm, 30-inch	With 10′0″ standard crossarms and in 8′6″ side-arm construction when diagonal brace is not to be used.
Crossarm, 24-inch	With pony (8′6″) crossarm and in 5′2″ side-arm construction.
Crossarm, 20-inch	With pony (5′2″) 6-pin crossarm.
Diagonal, with step	In side-arm construction
Brackets:	
House	For use at first point of attachment with "S" knobs in multiple drop wire runs.
Corner	For turning corners at first point of attachment or inside corners on drop wire runs.
Type A Transposition drop	For supporting insulator at transposition point on crossarm.
Wood Pole	For supporting insulators in bracket leads.
Clamps:	
1-Bolt Guy	With 2,200-lb. guy strand.
3-Bolt Guy	With 6,000-lb. and heavier guy strands.
Drop-Wire	Attaching drop wire to points of support.
Stub Reinforcing	Stubbing poles.
Clips, Bracket:	
No. 8067 Top	Reinforcing upper part of wood pole bracket.
No. 8067 Bottom	Reinforcing lower part of wood pole bracket.
Crossarms:	
10′0″ 10-pin Standard	3¼″x4¼″ 10-pin type for crossarm leads when salvaged for reuse.
8′6″ 10-pin	2¾″x3¾″ 10-pin type (pony) for crossarm leads.
5′2″ 6-pin	2¾″x3¾″ 6-pin type (pony) for crossarm leads.
6′0″ 6-pin	3¼″x4¼″ 6-pin type for crossarm leads when salvaged for reuse.
Extension Fixture:	
Pole Top	On poles to provide clearance for drop wire over highways and drive ways.
Hook:	
Drive, 7/16″x5″	Attaching drop wire to pole.
Guy	To hold wrapped guy strand in place.
Guard-Arm	Attaching drop wire to crossarm.
Drop-Wire	Fastening drop wire to masonry wall at first point of attachment (used with 5/16″x2¼″ hammer drive anchor). Also for attaching drop wire to pole top extension fixture.
Insulators, Glass:	
No. 9 or "Pony"	Single groove insulators commonly used for carrying steel line wires in standard span construction.
No. 10 or "Exchange" Type	Double groove insulator used interchangeably with the No. 9 insulator in standard span construction.
Knob:	
"C"	Split knob for fastening drop wire at intermediate points in run.
"S"	Single groove knob for wall or angle screw mounting at points of first attachment.
Loom:	
⅜″ Flexible (length as required)	For protecting drop wires past obstructions on buildings.
Nails, Galvanized:	
6-d	Fastening insulator pins in crossarm, also strain plate to pole.
10-d	Nailing together creosote planks for anchor.
30-d	Fastening wood pole bracket to pole.
50-d	Fastening wood pole bracket to pole.
Nuts:	
¾″ Forged Thimble Eye	In Guying arrangements with 6,000- and 10,000-lb. guy strand.

Table 4 (Continued)—List of Materials Recommended for Use in Rebuilding Rural Outside Plant.

ITEM	USE
1" Forged Thimble Eye	In guying arrangements with 16,000-lb. guy strand.
1½" Pipe Eye	On 1½" pipe used with 10" Swamp anchors.
2" Pipe Eye	On 2" pipe used with 12" and 15" Swamp anchors.
Pin:	
8" Wood Insulator	To support insulators on crossarm.
Pipe:	
1½" Steel	With 10" swamp anchors.
2" Steel	With 12" and 15" swamp anchors.
Pipe Couplings:	
1½" or 2"	For joining pipe used on swamp anchors.
Plate:	
Guy and Load	With thimble eye bolts.
Strain	When 6,000-lb. or heavier guy strand is to be wrapped around pole.
Poles:	
16' to 30' Classes 9 to 5	Standard line construction at locations other than railroad crossings.
Rings:	
⅝" Bridle	For runs of not more than 6 bridle wires or 5 drop wires.
1¼" Bridle	For runs of more than 6 bridle wires or 5 drop wires, also at 16 pr. cable terminals.
⅝" Drive	For supporting runs of bridle wire on pole.
Toggle Bridle, 1¼"	Supporting bridle wire runs on hollow tile walls.
Rods, Thimble Eye Anchor:	
½"x5'0"	With 5" 2-way expanding anchor.
½"x7'0"	With creosoted plank or log anchor.
⅝"x6'0" to 8'0"	With 8" 2-way expanding anchor. (The 8'0" rod is also used with creosoted plank or log anchors when heavier guying is required.)
¾"x8'0" to 10'0"	With 8"x25" plate anchor.
1"x8'0" to 10'0"	With 8'x35" plate anchor.
Screw:	
5/16" Angle	At points of first attachment of drop wire to building wall when angle between span and wall exceeds 30 degrees.
2½" x No. 10 R.H. Galvanized Wood	Fastening "C" knob to wood or masonry wall.
3" x No. 10 R.H. Galvanized Wood	Fastening "C" knob to stucco wall with wood backing.
1" x No. 14 R.H. Galvanized Wood	Fastening corner bridle ring to masonry walls.
2" x No. 14 R.H. Galvanized Wood	Fastening house bracket to wood.
2½" x No. 14 R.H. Galvanized Wood	Fastening house and corner brackets to stucco with wood backing.
2½" x No. 18 F. H. Galvanized Wood	To fasten "S" knob to wood surfaces.
3" x No. 18 F.H. Galvanized Wood	To fasten "S" knob to stucco on wood backing.
3½" x No. 18 F.H. Galvanized Wood	To fasten "S" knob to stucco on wood backing.
¼"x2" Fetter Drive	Fastening bracket clips and transposition drop brackets.
½"x4½" Galvanized Drive	Fastening guy hook, guy and load plate, and crossarm braces to pole.
½"x6½" Galvanized Drive	Fastening diagonal brace for extension arm when more than one such arm is used on a pole.
Screw Eye, Insulated	For wire runs on wood.
Sleeve:	
T2-109-to-045 D Compression	Splicing drop wire to No. 109 iron wire on open-wire lines.
Sleeves:	
3-045 B Compression	For splicing No. 17 parallel drop and No. 18 bridle wires.
3-064 B Compression	Splicing No. 14 drop wire.
3-036 A Compression	Splicing No. 20 bridle wire.
T2-045 B Compression	Splicing party wire to main wire in party-line taps.
1-102D (Straight Copper Compression)	Splicing No. 104 copper line wire.
2-109D (Straight Galvanized Copper) Compression	Splicing No. 109 steel line wire, also 104 copper line wire to No. 109 steel line wire.
92-109D (Offset Galvanized) Copper Compression	Dead ending No. 109 steel line wire.
T2-109D-to-045D (Split Offset Galvanized Copper) Compression	Splicing drop or bridle wire to No. 109 steel line wire.
T2-109D-to-109D (Split Offset Galvanized Copper) Compression	Splicing No. 109 jumper wire to No. 109 steel line wire.
Staple:	
1½" Galvanized Guy	Fastening wire used for bridling pole bracket when bracket clips are not available.
Strand, Galvanized Steel:	
2,200-lb.	For all light guying.
6,000-lb.	For heavier guying as required.
10,000-lb. 16,000-lb.	For heavy guying at railroad crossings as required.
Tape:	
¾" Black Friction	Miscellaneous uses in protecting drop and bridle wire and insulating wire splices.
Tie Wires:	
109 BB Galvanized Iron, 12"	Tying steel line wire to insulators.
Tubes:	
⅜"x3½" Porcelain	Insulating drop wire at entrances into buildings.
Washers, Galvanized:	
Style E Curved	For ¾" thimble eye bolt. (Size: 3" x3"x1¼" with 13/16" hole.)
Style C Curved	For 1" thimble eye bolt. (Size: 3" x3"x5/16" with 1⅛" hole.)
¾"x2¼" Square	With crossarm or double arm bolt.
1¼"x4" Square	With creosoted plank and log anchors.
9/16"x1⅜" Round	On guard arm hook (2 required).
Wire:	
No. 18 Paired Bridle	For ring wire runs from terminal.
No. 18 Copperweld or Bronze Drop	Standard drop wire.
No. 104 Copper or Copperweld	For overhead railroad crossing span. May be used, also, in excessively long leads to reduce transmission losses.
No. 109 (HTL-85) Galvanized Steel	Standard for all rural open wire construction.
No. 109 BB Galvanized Iron	Ordinary iron wire for miscellaneous uses, such as in bridling pole brackets and serving tails on guys.
No. 18 Bridle	For wire runs on poles.

minimum breaking strengths of the various classes of poles:

Pole Class	Breaking Strength	
1	4500 pounds	
2	3700 "	
3	3000 "	
4	2400 "	
5	1900 "	
6	1500 "	
7	1200 "	
8	1200 "	*
9	1000 "	*
10	800 "	*

*Not standard.

The classes and minimum lengths of poles to place in open-wire leads and the proper spacing between poles are indicated in *Table* 7. This data is intended for use with standard pole construction using B.B. or HTL-85 (109) steel line wire in the heavy loading district for leads of up to 3 crossarms. Class 10 poles are not specified in this table because their extremely small diameter makes them hazardous to climb. This size of pole, however, may be used to support an extremely long run of drop wire from the aerial wire connection to the residence.

Minimum Pole Lengths—Ground Clearances

THE LENGTHS of poles to select for the pole lead depends on the number of crossarms (or brackets) to be carried on the pole, the amount of wire sag, the clearance to be obtained between the lowest wires and ground, the difference between the ground level at the pole and that at the crossing point, and the depth to which the pole will be set. These factors are shown in Figure 16.

The minimum clearances between the lowest wire and ground is determined by conditions at the crossing as illustrated in Figures 17 to 21. The clearances specified are minimum distances at a temperature of 60° F., no wind, for the heavy loading zone. It is well, however, to maintain about one foot more clearance than the specified minimum clearances, especially over roadways, to avoid any possible controversy in case of accident involving contact with the telephone company's wires.

It should be noted that the minimum clearances increase with the increase in span length over 175 feet in the heavy loading zone (250 feet in the medium loading and 350 feet in the light loading districts) in accordance with the requirements of the National Electrical Safety Code. This increase is at the rate of 1/10 foot sag for every 10 feet increase or 3 inches additional sag for every 25 feet increase in span length. At crossings over roads and driveways, if the nearer crossing pole is located within 45 feet of the farther side of the road or driveway as indicated in Figures 17 and 20, the basic 18 feet clearance applies regardless of span length.

In the foregoing discussion on minimum clearances, the National

Table 5—List of Tools Recommended For Use in Rebuilding Rural Outside Plant

2—Axes, Chopping or hand
2—Bars, Digging
1 Set—Blocks, 3-sheave heavy
1 Set—Blocks, 3-sheave light
0 Prs.—Blocks, Slack, with grips
1—Blowtorch with soldering coppers
1—Brace with assortment of woodbits
1—Buckets, Canvas
1 Pr.—Bolt Cutters, 36-Inch
2—Files, Large mill
2—Flags, Danger
2—Hammers, Claw
2—Hammers, Striking
1—Hoist, Chain (or equivalent tool)
1—Hook, Carrying
1—Hook, Cant
1—Ladder, 24-ft. extension
1—Pike pole, 10-ft.
2—Pike poles, 12 ft.
1—Reel pin board (2-pin)
2—Reels, Wire
1—Rope, 25-ft., ½-inch
2—Ropes, 35-ft., ⅝-inch for handlines
1—Saw, Hack
1—Saw, Hand
1—Saw, 5-ft. Crosscut
3—Shovels, 8-ft. straight handle digging
1—Shovel, 5-ft. round-point
1—Sleeve compressing tool
2—Spoons, 8-ft.
2—Screwdrivers, large
1—Square, carpenters
2—Tamps, Pole
1—Tamp, Anchor (for expansion anchors)
1 Set—Wrenches, Pole stubbing
1—Vice, medium size
1—Trimmer, Tree

Table 6—Pole Dimensions and Weights—Creosoted Pine and Butt-Treated Cedar Poles

		5		6		7		8	9	10
		19		17		15		18	15	12
	Length Feet	Minimum Circumference In.	Weight Pounds Each	Minimum Circumference In.	Weight Pounds Each	Minimum Circumference In.	Weight Pounds Each	Weight Pounds Each	Weight Pounds Each	Weight Pounds Each
	16	21.5	234	19.5	202	18.0	165	133	138	110
Creosoted	20	23.5	330	22.0	284	20.0	234	261	202	161
Southern	25	26.0	491	24.0	422	22.0	334	389	289	234
Yellow	30	28.0	660	26.0	550	24.0	454	513	371	...
Pine	35	30.0	862	27.5	743	25.5	646	697	...	...
Poles	40	31.5	1059	29.0	921	27.0	807	...	...	...
	45	33.0	1274	30.5	1114	28.5	976	...	...	...
	20	25.5	240	23.5	180	22.0	160	160	120	90
Western	25	28.5	320	26.0	255	24.5	200	205	180	120
Red	30	30.5	400	28.5	335	26.5	280	295	225	...
Cedar	35	32.5	520	30.5	450	28.0	375	405	...	...
Poles	40	34.5	640	32.0	560	...	...	...	...	...
	45	36.5	800	...	...	...	...	...	...	...
	16	26.0	230	24.0	190	22.0	135	135	105	85
Northern	20	29.0	300	27.0	230	25.0	190	190	130	100
White	25	32.5	420	30.0	300	28.0	250	250	200	150
Cedar	30	35.5	520	33.0	420	30.5	350	350	275	...
Poles	35	38.0	720	35.0	510	32.5	450	...	...	...
	40	40.0	790	37.0	740	...	...	...	...	...
	45	42.0	1080	...	...	...	...	...	...	...

NOTE: Weights and dimensions for classes 1, 2, 3, and 4 are not listed in this table as poles heavier than class 5 are rarely needed on 3-crossarm leads.

Butt dimensions are circumferences measured 6 feet from butt end of pole. These dimensions are not specified for poles classed 8, 9, and 10.

Table 7—Pole Lengths and Spacings for Heavy Loading District

No. of wires	Ave. No. Poles per Mile	Span Length in Feet (1) Normal	Min.	Max.	Min. Pole Size Feet Length	No. Class (2)	Pole Fixtures No. of Brackets	No. of Crossarms 6-pin	8'6" 10-pin (3)
Standard Construction—East and West Sections of Line									
2	25	210	168	231	16	9	2	—	—
4 to 6	25	210	168	231	16	9	—	1	—
8 to 10	25	210	168	231	16	8	—	—	1
12	25	210	168	231	20	8	3	—	1
14 to 20	36	146	117	160	20	8	—	—	2
22	36	146	117	160	20	6	2	—	2
24 to 30	40	132	106	145	20	5	—	—	3
Standard Construction—North and South Sections of Line									
2	25	210	168	231	16	9	2	—	—
4 to 6	25	210	168	231	16	9	—	1	—
8 to 10	25	210	168	231	16	8	—	—	1
12	25	210	168	231	20	8	2	—	1
14 to 20	30	176	141	194	20	8	—	—	2
22	30	176	141	194	20	6	2	—	2
24 to 30	36	146	117	160	20	5	—	—	3

Notes:

1. Minimum and maximum span lengths based on standard practice of limiting pole spacings to 20 percent under normal spacing and 10 percent over normal spacing.
2. If adequate clearance cannot be obtained with the use of minimum length poles, taller poles should be placed.
3. When recovered crossarms are available, 10 ft. 10-pin arms may be substituted. Crossarms of the same length should be grouped in continuous sections.

Electrical Safety Code was given as the authority for the clearance requirements. In certain states, however, the state regulatory body may specify requirements different from those given in the Safety Code. In such cases, the telephone company should obtain rules on wire clearances from its state regulatory body and follow its requirements.

In determining the lengths of poles for crossing situations, the following facts will be found helpful:

(a) For two-wire bracket leads and one crossarm leads crossing a road on level terrain as shown in Figure 17, two 25-ft. poles, one on each side of the road with the nearer pole on the property line or corner will provide sufficient clearance for the crossing span above the ground. For two-crossarm and three-crossarm leads, two 30-ft. poles on each side of the crossing would be required. In the case of a combined two-crossarm and bracket lead, the brackets should be placed higher up on the pole and opposite each other, or a crossarm used in place of the brackets on the poles adjacent to the road, if necessary to obtain the desired clearance.

(b) When a two-wire or a one-cross-arm lead crosses over a farm drive-way, as shown in Figure 20, a 25-ft. pole located within 25 feet of the driveway center will provide sufficient clearance. A 30-ft. pole would have to be placed for a two-crossarm or three-crossarm lead.

Clearances From Foreign Circuits

TELEPHONE lines are exposed to the possibility of contact with foreign circuits such as circuits of other telephone companies and telegraph, railroad signal, and electrical power lines. Of these, contact with power lines presents the greatest hazard because of numerous points of possible contact and the high voltages and currents carried by these lines.

Contact with power circuits is reduced to a minimum by care in locating the telephone line at a sufficient distance from the paralleling power lines and by maintaining adequate clearances between these lines at crossings. The telephone lead should be located on the opposite side of the road from the power lead in all cases. Underbuilding the power line is a very hazardous procedure and greatly increases the chance of sagging or falling power wires contacting the telephone wires. Furthermore, the proximity of the high voltage wires aggravates the noise induction problem. Ordinarily, a private right of way for the telephone or the power

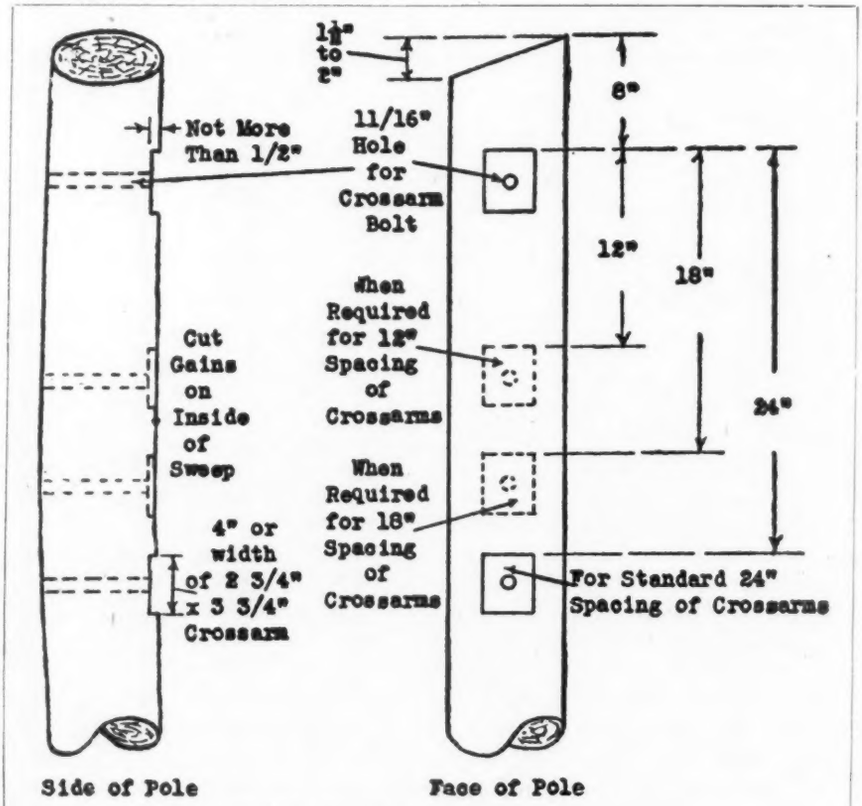
1½" to 2"
8"
Not More Than 1/2"
11/16" Hole for Crossarm Bolt
12"
18"
When Required for 12" Spacing of Crossarms
Cut Gains on Inside of Sweep
24"
When Required for 18" Spacing of Crossarms
4" or width of 2 3/4" x 3 3/4" Crossarm
For Standard 24" Spacing of Crossarms
Side of Pole
Face of Pole

Fig. 15—Framing dimensions for poles.

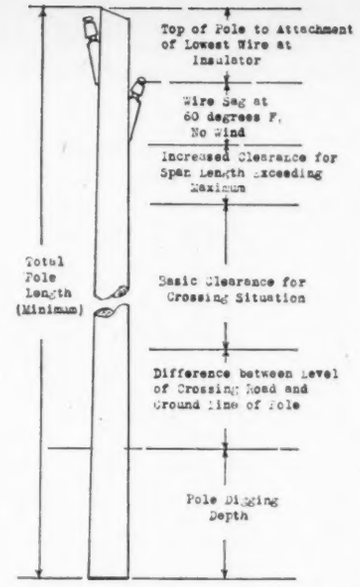
Top of Pole to Attachment of Lowest Wire at Insulator
Wire Sag at 60 degrees F. No Wind
Increased Clearance for Span Length Exceeding Maximum
Total Pole Length (Minimum)
Basic Clearance for Crossing Situation
Difference between Level of Crossing Road and Ground Line of Pole
Pole Digging Depth

Fig. 16—How minimum length of pole is determined.

line will solve this problem, but if it is a question of underbuilding the power circuit or utilizing a route along a different section line, the latter is certainly the preferable alternative.

Figure 22 indicates clearances that are needed to adequately protect the telephone wires from contact with power wires at crossings of these lines. It should be noted that, as the voltage of the power line goes up, the minimum clearances increase in proportion. This additional clearance is made necessary by the fact that, in case of a lightning stroke that strikes the power wires and then jumps to the telephone wires, a power-follow arc will result unless the separation between the two circuits is sufficiently great to extinguish the arc. The length of this arc is proportional to the voltage of the power lines.

Since power lines have very long spans, there is a tendency for the spans to sag considerably under ice loads, this sag increase being the greatest at the center of the wire sag. The longer the span, the greater is this effect. The National Electrical Safety Code requires an increase in the separation between the crossing power and telephone conductors proportional to the distance between the telephone line and the nearer crossing pole as illustrated in *Figure* 23. The minimum separation becomes a maximum in the center of the sag in the power line. The formula for determining this increase in separation over the basic 4′0″ or 6′0″ clearance is rather complicated. As a rule, however, it is the practice of the power

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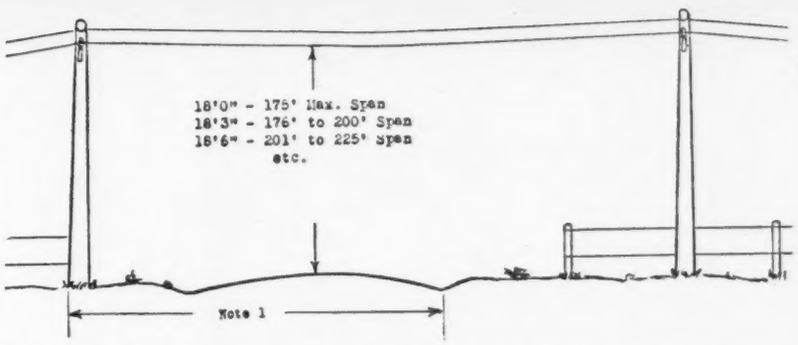

Fig. 17—Minimum clearance over roadway. Note 1. If the distance between the nearest pole and the farthest edge of the road is 45 feet or less, the minimum clearance is 18′ 0″ regardless of span length.

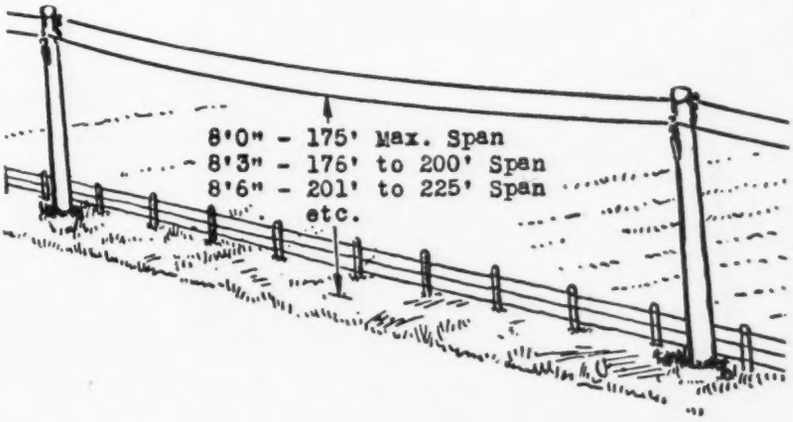

Fig. 18—Minimum clearances permitted for open wires paralleling a roadway where a fence or other obstructions will prevent passage of vehicles under the wires.

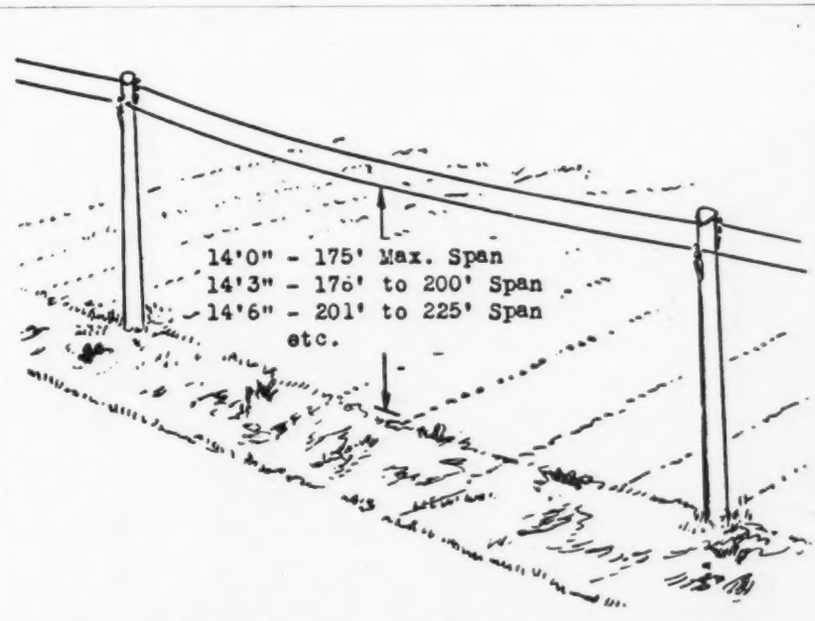

Fig. 19—Minimum clearances permitted for open wires crossing over a private right of way or paralleling a roadway where there are no obstructions to prevent vehicles from crossing under the wires.

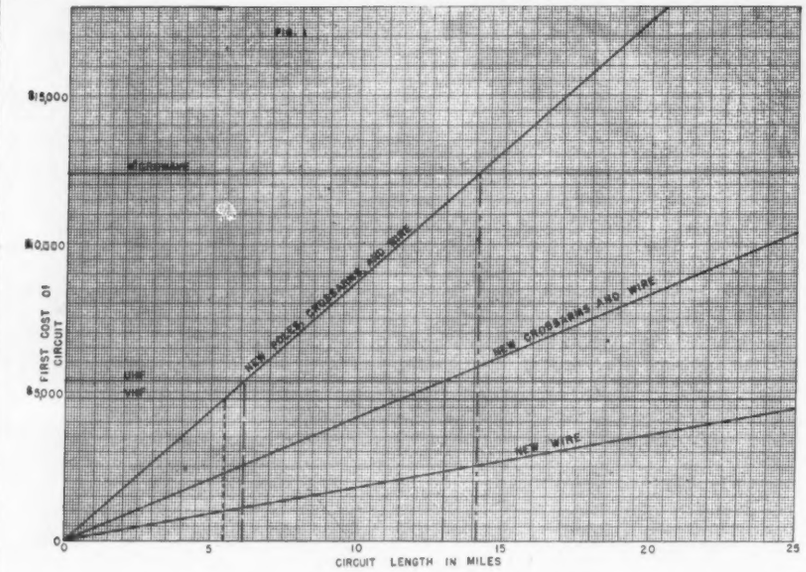

Fig. 1—First cost of single circuit.

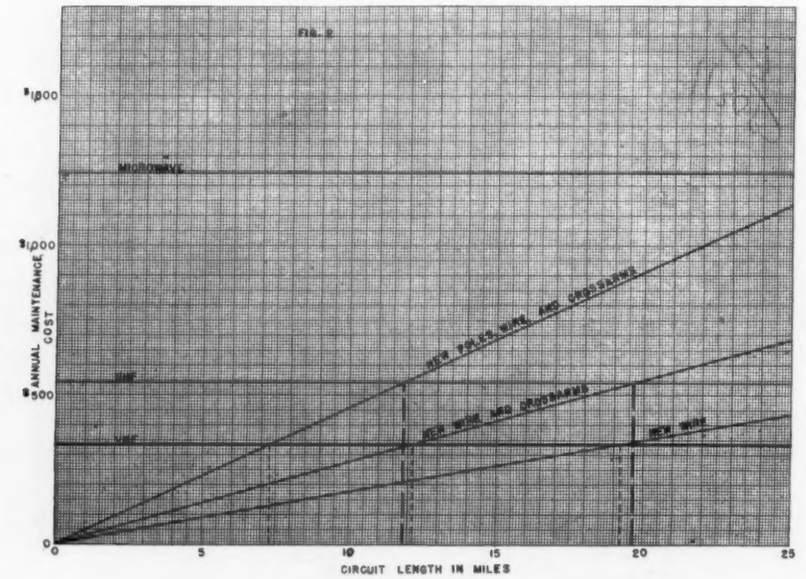

Fig. 2—Annual Maintenance Cost of single circuit.

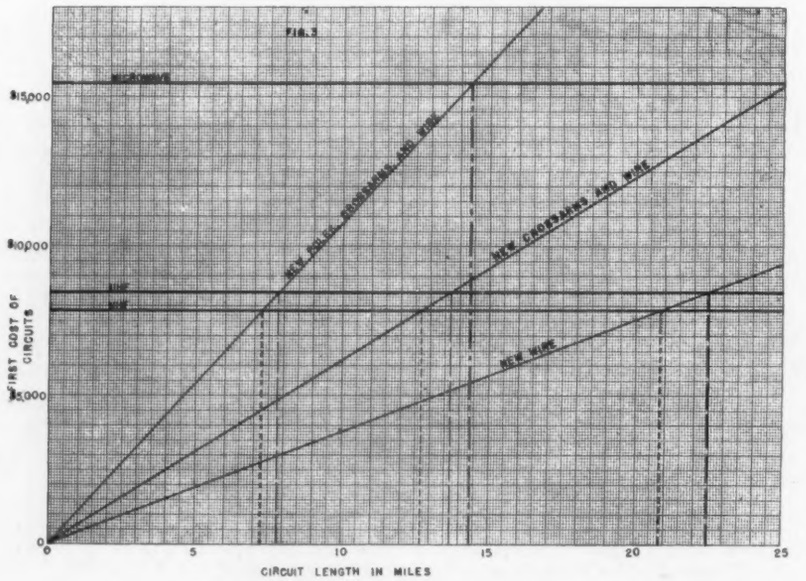

Fig. 3—First cost of three-circuit system.

Modern Toll

IN RECENT years practical radio equipment has been developed to operate in the higher frequency regions where interference is normally low and the received radio waves are stable and not subject to wide variations in amplitude. By using such equipment it is possible to establish reliable point-to-point radio links for toll and other services. The purpose of this article is to consider, from an economic as well as a practical viewpoint, the advantages and disadvantages of those portions of the radio-frequency spectrum available to common carriers for point-to-point service.

The sections on *Availability of Frequencies and Equipment, General Technical Considerations,* and *Advantages of Radio-Toll Circuits* are essentially a review of material that has been presented previously in various forms, but are included for completeness. The remainder of the article is relatively new material and attempts to give an economic evaluation of the place of radio-toll circuits in the telephone field today. An attempt will be made to determine the conditions under which radio-toll circuits may economically compete with wire-line construction for small traffic volumes. A description is given of experience to date with radio equipment suitable for this service.

Availability Of Frequencies And Equipment

THE FIRST problem to be considered whenever new construction is contemplated is that of availability of materials. In the case of a radio-toll link, this means that suitable radio equipment must have been developed. Furthermore, since the use of radio frequencies is controlled by the Federal Communications Commission, it must be determined that the available radio equipment can be used in that portion of the radio-frequency spectrum available to common carriers for fixed service.

The allocations made by the Federal Communications Commission, as listed in the Federal Register of May 6, 1949, contain seven different regions of the frequency spectrum from 25 to 30,000 Mc (Megacycles per second) that are available for fixed point-to-point use by common carriers, under various restrictions.

These seven regions are:

Toll Circuits By Radio Today

by

Edward Daskam, Jr.

Radio Engineer

General Telephone Service Corp.

(1) The 35-44-Mc band where there are 24 single frequencies assigned to common carriers for use primarily in establishing mobile-radiotelephone service. From the listing these frequencies apparently are also available on a *secondary* basis for fixed *point-to-point* operation on the condition of non-interference to the primary mobile service. Widespread use has been made of these frequencies in establishing highway mobile service, however, and their transmission is such that long-range skip interference is not uncommon. Because of the probability of interference with the mobile services, the Federal Communications Commission, it is understood, will make *no point-to-point* assignments in this band—hence usable frequencies for the purpose under discussion will have to be found elsewhere in the spectrum.

(2) The 72-76-Mc band where there are 80 single frequencies available to common carriers for *point-to-point* use on a *secondary* basis of non-interference to adjacent television channels and a multitude of operational fixed stations (e.g., police, fire, forestry, highway maintenance, etc.). Despite the large number of channels and the fact that economical equipment exists, the non-interference condition to such a large number of prior users does not make the *general* use of these frequencies too attractive for the telephone companies.

(3) The 152-162-Mc band where there are 20 single frequencies available to the common carriers for *point-to-point* use on a *secondary* basis. Eight of these 20 frequencies are secondary to miscellaneous common carriers as the primary service. While these could be used in rural areas, the possibility of being forced to vacate a frequency by a limited common carrier establishing mobile service in the same region must not be ignored. The remaining 12 of these frequencies are secondary to common-carrier mobile-radiotelephone service, and so their use for point-to-point operation is reasonably safe in small communities and rural areas. However, the possibility of one or more telephone companies having to establish mobile-radiotelephone service on sufficient channels (even in a rural area) to force abandoning the point-to-point use of a frequency exists and, though its probability may be small, it must not be overlooked. Economical equipment operating in this region is readily available.

(4) The 450-460-Mc band where there are 20 frequency channels available to both the miscellaneous common carriers and the telephone companies for use primarily in mobile service, but also available for fixed *point-to-point* service on a *secondary* basis. If this remains the only assignment in this region, the telephone companies may not be able to use it extensively for *point-to-point* service because of the risk of being forced to vacate a frequency due to either common carrier or miscellaneous common carriers establishing mobile service in the same vicinity. In rural areas, however, the risk probably should not be controlling. Within the next half year a hearing is scheduled to take place before the Federal Communications Commission in which it will be determined whether or not the region from 470 to 500 Mc should be reassigned from the broadcasting services to common carriers for establishing broad-band-multiplex mobile-radiotelephone systems in urban areas. In the event it is reassigned to common carriers, the United States Independent Telephone Association plans to request authority from the FCC to use these same frequencies on a *secondary* basis for *point-to-point* service. Since the broad-band-multiplex system would, for economic reasons, almost have to be confined to the larger cities where many channels are needed, such an assignment would give practically unrestricted use of these frequencies for *point-to-point* service in rural areas with little or no probability of being forced to vacate them. The outcome of this hearing is, of course, a matter of speculation; but, should a finding favorable to the telephone companies be made, this might well become one of the most important bands for *point-to-point* toll circuits. Economical equipment operating in this region is now available.

(5) The 3700-4200-Mc band. This region is available for *point-to-point* use by common carriers on a *primary* basis, and suitable equipment for this band has been developed, although it is still somewhat expensive.

(6) The 5925-6425-Mc band. This region is available for *point-to-point* use by common carriers on a *primary* basis and suitable equipment has been developed, although its present cost, for general use, places it out of economic reach.

(7) The 10,700-11,700-Mc band. This region is also available for fixed *point-to-point* operation by common carriers on a *primary* basis, but suitable equipment has not yet been developed.

Summarizing the foregoing, it can be seen that there are three distinct

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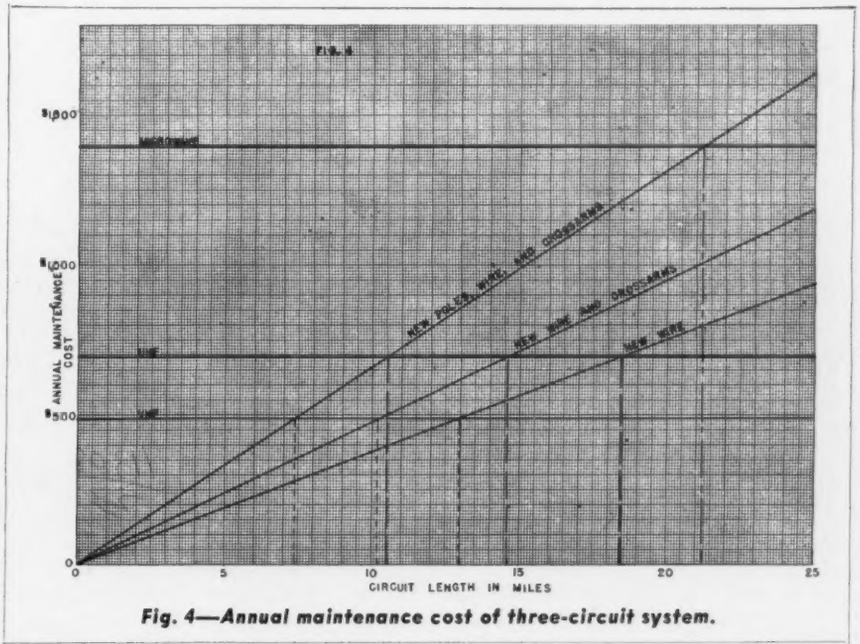

Fig. 4—Annual maintenance cost of three-circuit system.

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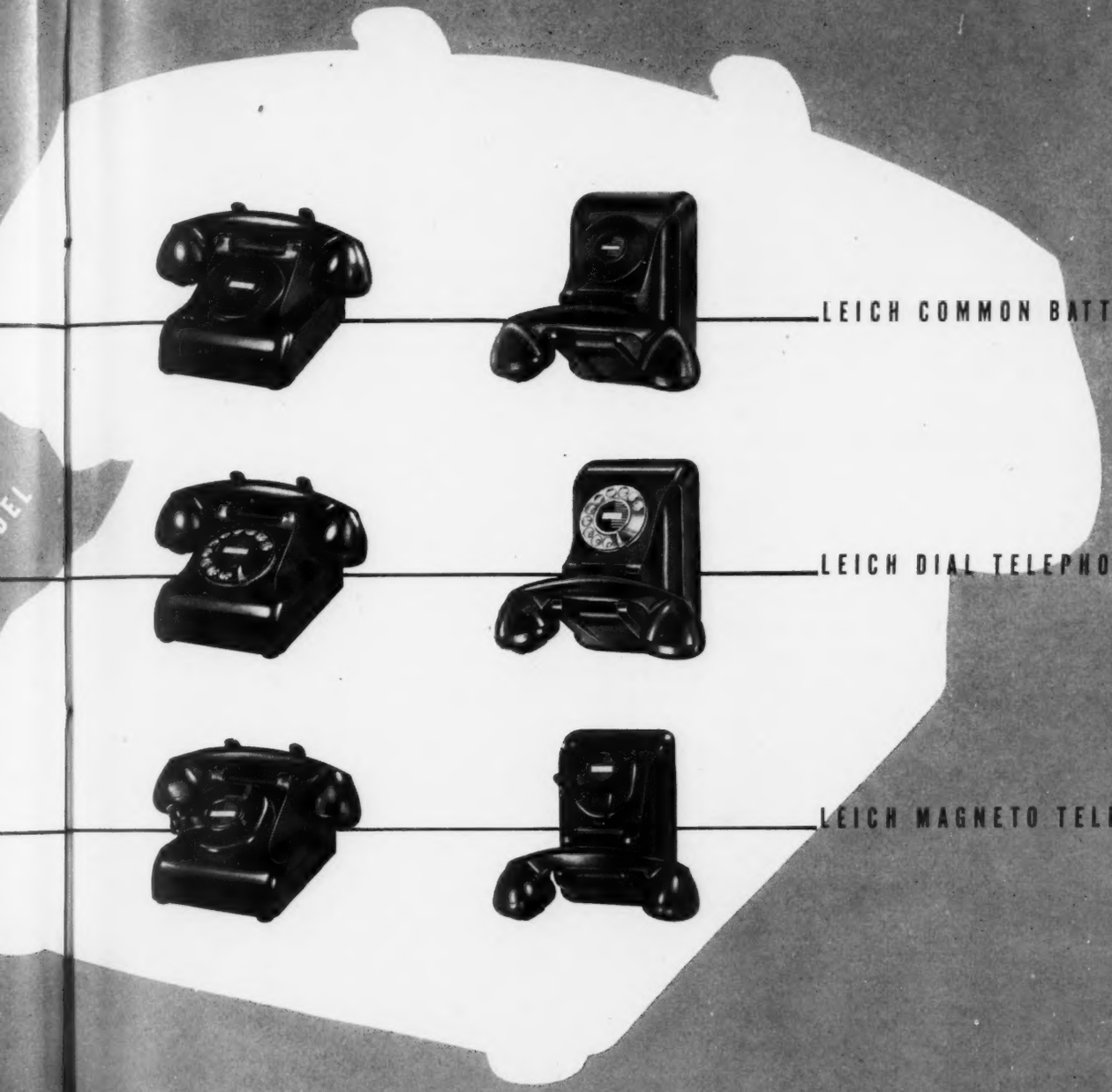

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portions of the frequency spectrum from 25 to 30,000 Mc in which *point-to-point* operation by common carriers is now feasible from the standpoint of frequency assignment and equipment development. These are located in (1) the very-high-frequency or VHF region (152-162-Mc assignment), (2) the ultra-high-frequency of UHF region (450-460-Mc assignment), and (3) the microwave region (3700-4200 and 5925-6425-Mc assignments).

Radio-Frequency Transmission

SATISFACTORY transmission in the microwave region requires a "radio line-of-sight" path between the transmitter and receiver that clears all obstacles by at least fifty feet. For UHF and VHF a "radio line-of-sight" path that just barely clears all obstructions will usually be satisfactory. No "bending" around obstacles exists for microwave transmission and only slight "bending" occurs for UHF waves. Satisfactory VHF transmission is possible around obstacles, however, providing they are not so large or so close to one of the terminals as to require abrupt "bending" of the radio beam. Since the earth is curved and a line-of-sight or near line-of-sight transmission path is desired, it can be seen that the maximum range for a radio link depends on antenna height; the range of radio coverage increasing as the antenna height increases. In determining this range, for the purposes of the following discussion antenna heights of 75 feet will be assumed since wooden poles of sufficent size to allow such a height are available, while antennas of greater heights would probably involve the erection of a small steel radio tower with a consequent increase in cost.

Transmitting and receiving antenna heights of 75 feet give a maximum "radio line-of-sight" path over flat terrain of about 25 miles. This approximately represents the maximum range for satisfactory multi-channel operation of the VFH and UHF circuits using 20 to 50-watt transmitters and moderately directional antenna systems. In order for the microwave circuits to be reliable for this distance, another 50 feet of antenna height or a total of 125 feet would be desirable and could be obtained by locating the antennas on small knolls or hills adjacent to the central office or atop reasonably tall buildings. This maximum range of 25 miles is for single "hop" transmission and does not contemplate the use of "pickup-relay" stations. By using such stations, it is possible to extend the radio link up to ten or more times the single "hop" range. If use can be made of high hills or mountains to maintain line-of-sight transmission, up to 40 or 50 miles can be covered in a single "hop."

Both transmitting and receiving antennas at one terminal can be mounted on cross arms atop a single large telephone pole if the two frequencies used are sufficiently separated. Alternatively, VHF and UHF antennas can be mounted on guyed pipe extensions attached to shorter telephone poles to give the desired antenna heights, but the size and weight of the microwave antennas precludes the possibility of using any such arrangement for them.

In mountainous or hilly areas, a suitable high location, necessary to obtain near "line-of-sight" transmission, might only be found some distance from the central office. Use of these sites may involve the construction of small buildings to house the equipment as well as possibly requiring the extension of power and telephone lines to them. Despite the added cost of such an installation, radio may prove attractive economically because of the very high cost of building wire lines where transmission over rugged terrain is necessary. Similarly, radio proves advantageous where transmission across lakes and bays is desired. However, if radio is to be a generally applicable tool, it must be economically attractive in the usual as well as in the exceptional case. The usual case would involve flat or gently rolling country. In those instances it generally would be possible to use existing central-office buildings to house the equipment, thus eliminating the need for additional buildings and power and telephone-line extensions.

Susceptibility To Interference

MAN-MADE interference, such as is caused by some industrial machines, automobile ignition systems, diathermy equipment, etc., may cause the noise level to rise appreciably above normal receiver "hiss" in VHF circuits in some locations. Of course, if such interference is encountered in a circuit, it is possible to trace it down and eliminate it, but this procedure may be time consuming and costly. Man-made interference has little effect on UHF circuits and none on microwave circuits. Another form of interference that will raise the noise level in a radio circuit is that caused by other radio equipment operating on the same or nearly the same frequency in the same vicinity. This can be minimized by avoiding the use of identical or adjacent frequency assignments for several systems operating in the same area. Any interference of this sort that is due to other *point-to-point* systems is less likely to occur in a microwave than in a VHF system. This is due to the fact that low-powered transmitters and highly directive antenna systems are used with microwave equipment. Generally speaking, from the standpoint of immunity to various types of outside interference, the microwave system is the best, the UHF next best, and the VHF the most susceptible.

Channelizing

FOR REASONS of voice-circuit stability, as well as noise reduction, a properly designed frequency-modulation system should be used. Providing that the band of modulation frequencies that can be transmitted over the radio link is sufficiently wide, a single radio link is capable of being adapted to carry several separate telephone conversations through the use of equipment similar or identical to carrier equipment used with wire lines. Such equipment, as applied to radio techniques, is termed "channelizing" or "multiplexing" equipment. Radio equipment using frequency modulation with at least a 30-kc modulation bandwidth is available for all of the aforementioned VHF, UHF, and microwave-frequency regions. With such radio equipment, channelizing equipment can be used to provide up to seven voice channels, complete with ringdown-toll or two-way dial supervision over a single radio link.

One of the simplest, most flexible, and most economical methods of channelizing the radio link is to add, as needed, low-cost short-haul carrier systems of the same type generally used with land lines. Since two different radio frequencies are needed for one point-to-point circuit, one for each direction of transmission, the radio path is analogous to a four-wire land-line carrier system.

Therefore, the same channelizing carrier frequencies can be repeated for opposite transmission directions. This means that a carrier system which would provide only three additional circuits on a two -wire land line can be used to give six additional circuits on a radio link. If the original circuit directly over the radio link is added, this means a total of seven separate circuits can be obtained from such a system. Specially developed channelizing equipment may, of course, be used in substitution for conventional wire-line short-

haul carriers, if it is economically attractive and well designed.

Voice-Frequency Transmission

THE QUALITY of voice circuits obtained from a radio link is generally good and is limited more by the termination unit or channelizing equipment than by the radio equipment itself. *Cross talk* between channels of a particular radio link depends upon both the radio and channelizing equipment, while the *noise level* of the circuits is determined mainly by the radio path.

Some Advantages Of Radio-Toll Circuits

RADIO-TOLL circuits have distinct advantages over wire-line toll circuits in flexibility, immunity from storm damage, and ability to provide stable, low-loss circuits.

The flexibility of radio-toll circuits is one of their outstanding characteristics. Consider the case of a small distant community that may be of a transient nature but which, during the few years of its existence, might be a profitable source of toll revenue. The ephemeral nature of such a community would make it economically impossible to justify building land lines in most instances since a land line has a low net salvage value due to the large amount of labor involved both in erection and salvage operations.

Radio-toll circuits on the other hand involve only the erection of one or two poles at each end of the circuit, and two or three days should suffice to complete an installation. Once the need for such toll circuits at a locality vanishes, the equipment is readily removed and can be set up at some other location where demand for toll circuits exists. This same line of reasoning can be applied where seasonal toll relief of resort communities is a problem. Thus good sources of toll revenue that once would, of necessity, have been ignored, because of their temporary or periodic nature, now can be profitably tapped using the flexible communication tool of radio.

Centralized Maintenance

BECAUSE radio-toll circuits have all of the physical plant lumped at the two ends of the circuit, the maintenance and repair is simplified, particularly in bad weather. Futhermore, this centralized construction makes radio-toll circuits relatively immune to storm damage. This is particularly important in those areas where heavy sleet storms, which wreak such havoc with wire-line construction, are periodically experienced. The only outside plant needed for a radio-toll circuit is the antenna structures and, since these merely support their own weight and are not subject to transverse stress (as are the telephone poles in a land line), they are almost impervious to storm damage.

Due to the use of a properly designed frequency-modulation system, variations in radio-frequency transmission do not affect the voice-circuit loss to any appreciable extent. Thus, changes in weather have little effect on the voice-circuit loss in any of the circuits derived by channelizing a radio link, while wet weather and sleet deteriorate physical transmission on a land line and affect any carriers that are superimposed on the land line even more. Furthermore, it is possible to obtain very low loss circuits from the radio link since the radio and carrier equipment contain amplifying circuits similar to those used in wire-line repeaters. Thus, it is possible to obtain lower loss circuits for a given distance with radio-toll circuits than would be possible from a wire line without repeaters.

The first cost of a medium-

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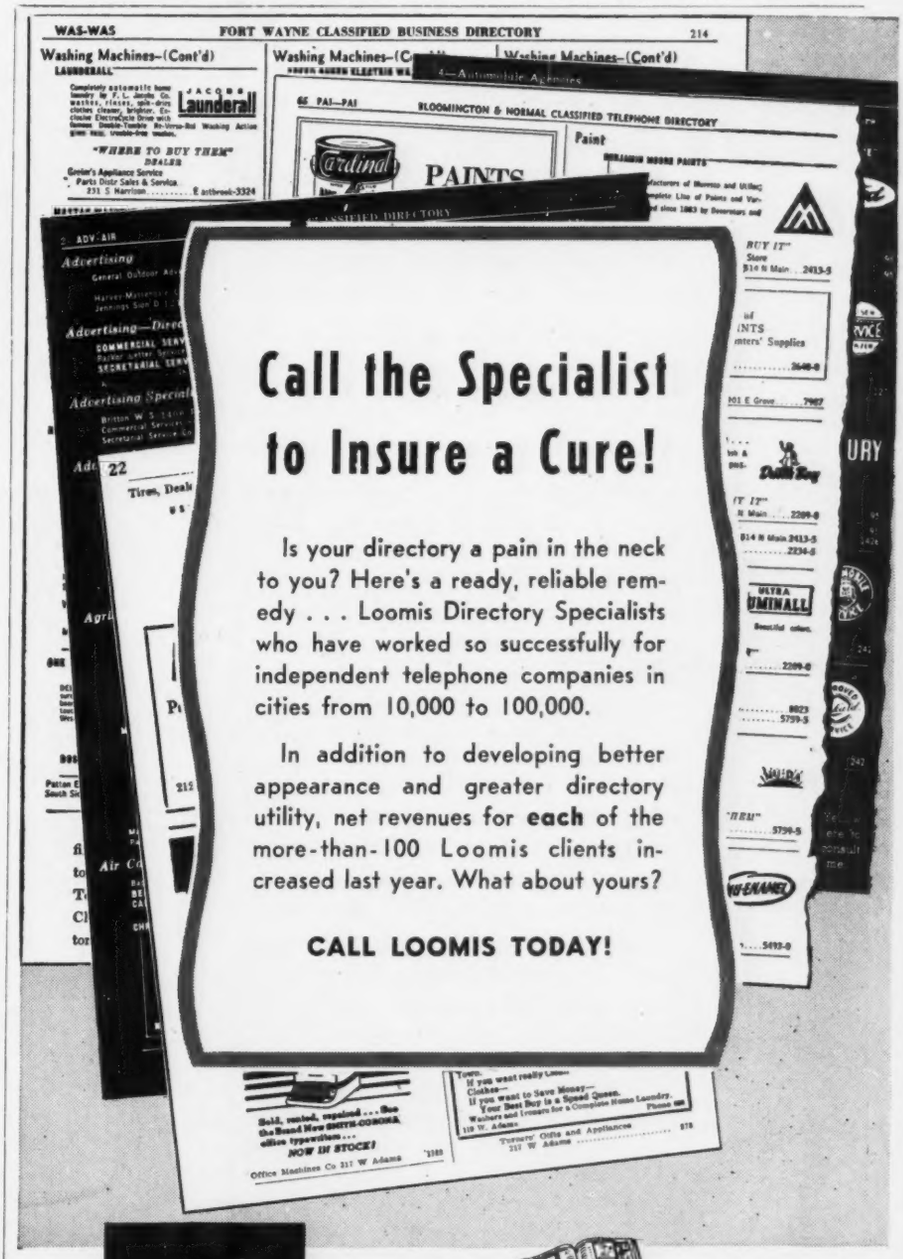
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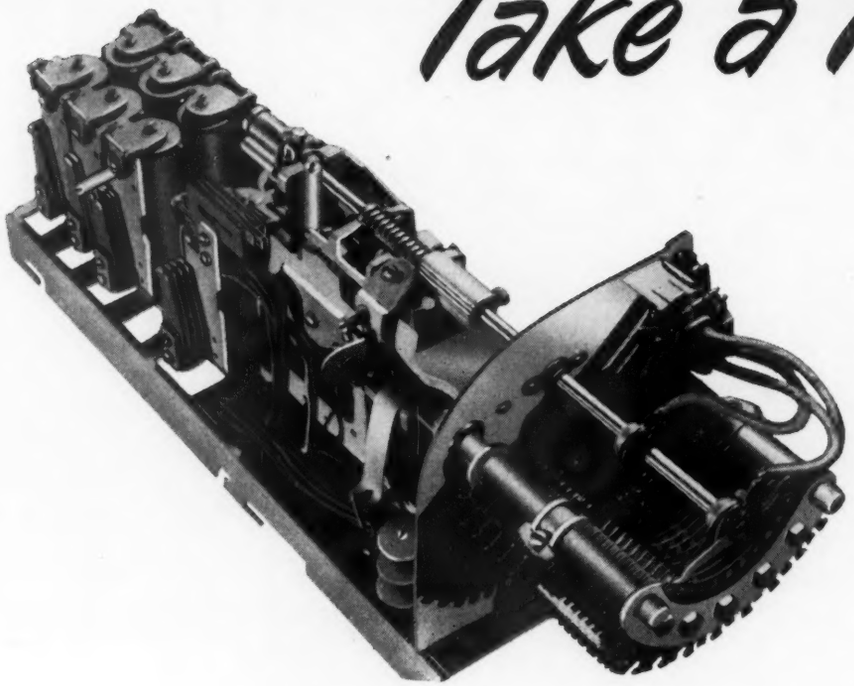
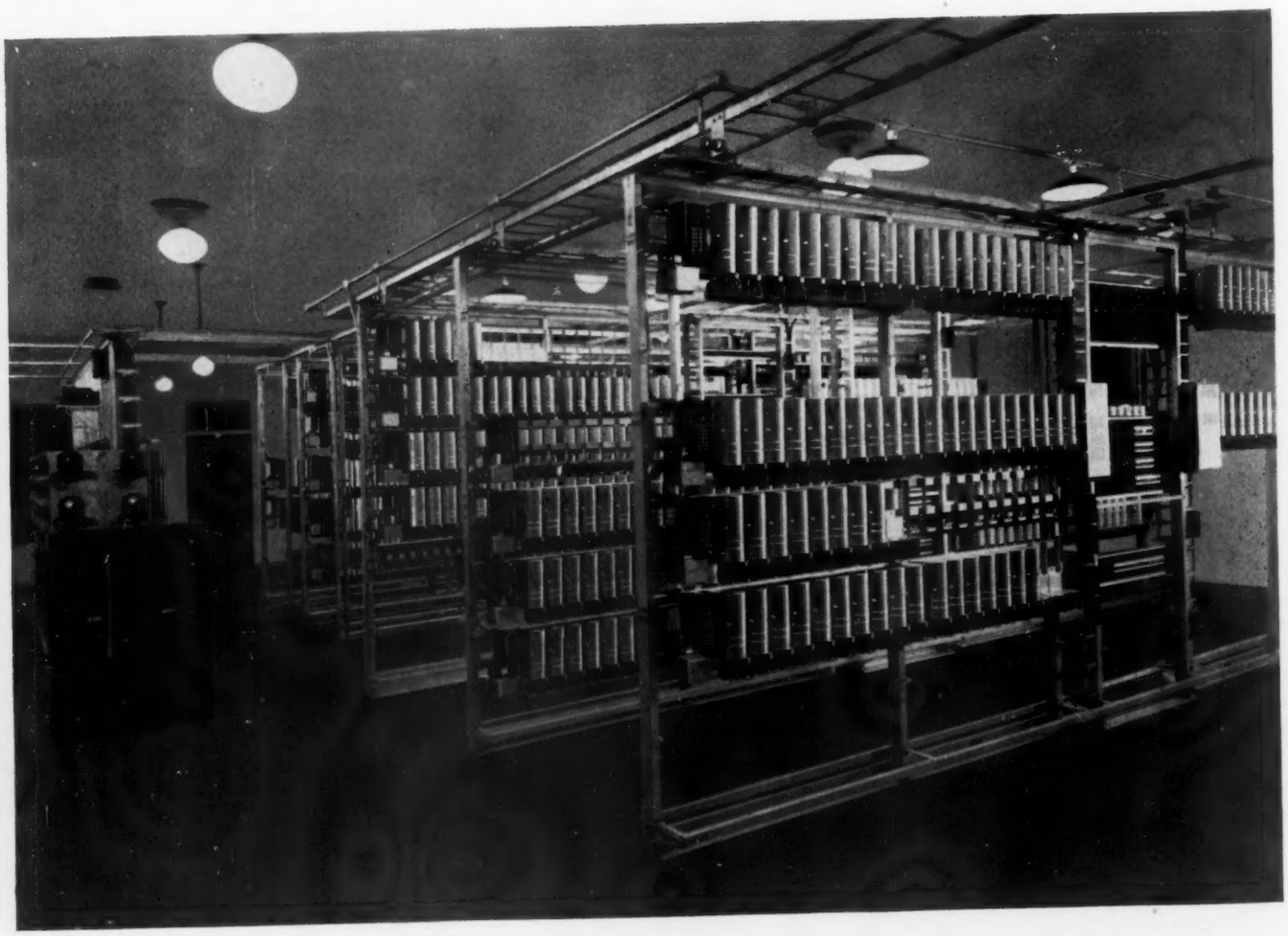


College View office of Lincoln Telephone and Telegraph Company, users of Strowger Automatic equipment since 1905, in exchanges of all sizes.



Tip from the LEADERS—

standardize on

STROWGER AUTOMATIC

You take no chances on quality when you can install the equipment that for years has set the highest standards of service and economy that the world has ever known. In every TYPE of exchange, in exchanges of every SIZE, Strowger Automatic has PROVED its dependability, its low operating and maintenance costs, its long life and flexibility. It has proved itself, over the years, to be the most economical equipment you can buy.

To choose equipment that merely "looks good" means risking both your stockholders' money and your service to subscribers. Throughout telephone history, we have seen new automatic systems appear, only to be discarded because they have failed to meet the tests of economy and dependability for which Strowger Automatic is famous.

That's why leading telephone companies, with all the world to choose from, continue to specify Strowger Automatic!

If you want to be SURE when you buy central office equipment, take a tip from the leaders. Install Strowger Automatic, the equipment that combines the safety of known performance, and the constant improvement that keeps it abreast of every need.

AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems
Makers of Telephone, Signaling and Communication Apparatus . . Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions: Automatic Electric Sales Corporation
Export Distributors: International Automatic Electric Corporation
1033 West Van Buren Street, Chicago 7, U. S. A.

Banquet table at recent Nebraska "Golden Jubilee" Convention.

Nebraska Holds "Golden Jubilee" Convention

WHEN THE time comes for you or your organization to plan a 50 year Anniversary celebration, we can enthusiastically recommend George M. Kloidy, secretary-treasurer of the Nebraska Telephone Association as a capable organizer of the proceedings. The recent Golden Jubilee convention of the Nebraska Telephone Association was a remarkable proof of Mr. Kloidy's efficiency at master-minding and directing a top-rated program commemorating the 50th year of service by the Nebraska association.

The meeting at the Hotel Paxton, Omaha, March 28-29, was highlighted by the introduction of past presidents of the Nebraska Association by Secretary Kloidy. Past presidents presented to the convention included Frank H. Woods, Lincoln; Otto Fuerst, Scottsbluff; John H. Agee, Lincoln, and D. M. Davis, Aurora. Because of ill health the following living past presidents were unable to be present; W. E. Bell, F. F. Roderick, D. E. McGregor, A. B. Clark, and W. W. Johnson.

In his response to the introductions Mr. Woods, chairman of the board of the Lincoln Telephone & Telegraph Company, looked both back and ahead. He traced the early history of telephone business and reviewed the tremendous progress which has been made in 50 years resulting in a nationwide telephone system which is far ahead of any in the world. Mr. Woods struck a responsive cord among the listening telephone men when he urged an active and aggressive approach to the problem of helping to fully preserve and restore the free enterprise system and the individual freedom which has characterized the past 50 years.

Retiring President Neil Shreck discussed in his annual address the various problems and possible solutions which confront the industry. He urged all telephone companies to present a unified front and to actively assist the association in helping to eliminate the unfair excise tax on telephone service.

Discussing present activities of the association, Mr. Shreck explained how the group cooperated with the USITA to protect the smaller companies from application of the federal minimum wage rate and in securing amendments to the Rural Telephone Loan Act.

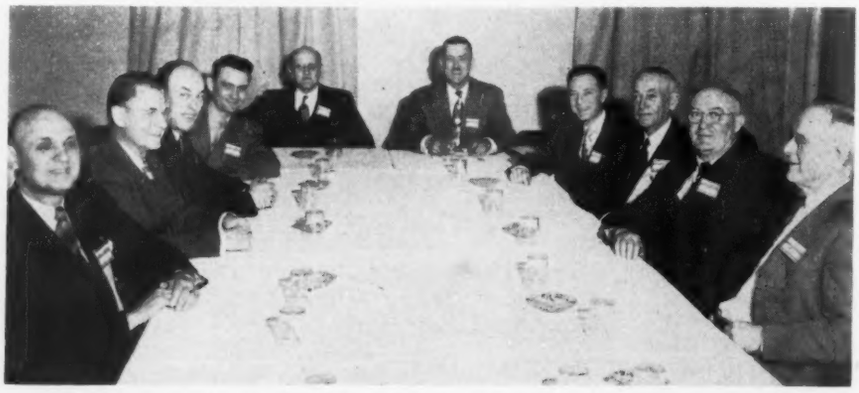
In another timely address C. C. Pearce, manager of the Riceville (Ia.) Farmers Telephone Company, told delegates they must keep the public informed on improvements.

"There is more to public relations for a telephone company than polite operators and trouble men who wipe their feet before they go into a house," he said.

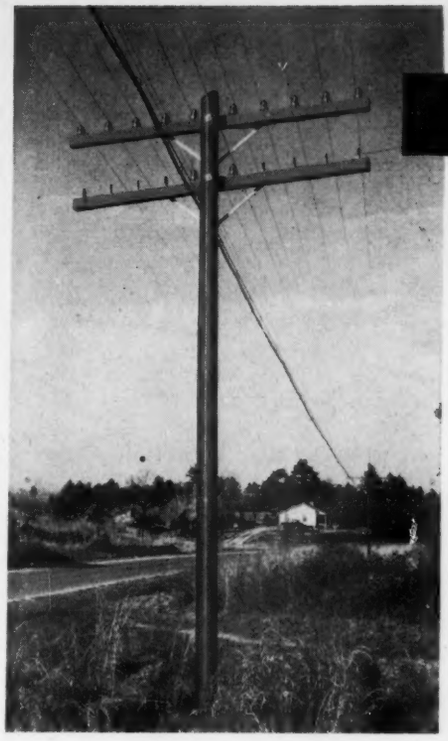
Mr. Pearce emphasized that keeping the public informed on improvements, no matter how small, is equally important. "Subcribers," he said, "are interested but frequently aren't told about even such major changes as switchover to a dial system."

The desire to perform public service led Mr. Pearce's company to build a public recreation room in the basement of its Riceville building. Forty organizations from the Boy Scouts to the Women's Christian Temperance Union held more than

(*Please turn to page* 56)



Officers and directors of the Nebraska Telephone Association. Left to right: Merle M. Hale, Lincoln, president; J. W. Hudson, Aurora; H. L. Fentress, Omaha; R. C. Hunt, Blair, vice president; G. M. Kloidy, Lincoln, secretary-treasurer; Neil Shreck, Bertrand; K. L. Schroeder, Columbus; Otto Fuerst, Scottsbluff; Emil Volske, Stanton, and D. M. Davis, Ridgeman, Mich. Director H. D. Thompson was not present when photo was taken.



LIGHTER

Taylor-Colquitt
VAPOR-DRIED POLES

Poles produced by Taylor-Colquitt's exclusive vapor drying process are, class for class, 10 per cent lighter than green poles conditioned by steam in the conventional manner for preservative treatment. With less weight is greater strength — so much more that generally vapor dried poles one class smaller than other types will serve. The substantial savings that can be made both in purchase price and installation costs because of these two factors make Taylor-Colquitt Vapor Dried Poles far and away the most economical that can be had.

Add the careful timber selection, precise manufacture and thorough preservative treatment that have made Taylor-Colquitt Poles preferred for so many years . . . and you'll always specify Taylor-Colquitt Vapor Dried Poles.

Taylor-Colquitt Vapor Dried Poles are distributed to independent telephone companies exclusively by Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7, Illinois.

TAYLOR-COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA

PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these Shares. The offer is made only by the Prospectus.

50,938 Shares

Peninsular Telephone Company

Common Stock

(no par value)

The Company is offering these shares for subscription to the holders of its outstanding Common Stock, to whom Subscription Warrants have been issued, and to certain officers and employees, as more fully set forth in the Prospectus. The Subscription Warrants expire at 3 P.M. Eastern Daylight Saving Time on May 16, 1950.

Subscription Price $40 a Share

The undersigned several underwriters may offer shares of Common Stock at prices not less than the Subscription Price set forth above, less any concession allowed to dealers, and not greater than either the last sale or current offering price on the New York Curb Exchange, whichever is greater, plus an amount equal to the commission of the Curb Exchange.

Copies of the Prospectus may be obtained from only such of the undersigned as may legally offer these Shares in compliance with the securities laws of the respective States.

MORGAN STANLEY & CO. *COGGESHALL & HICKS*

G. H. WALKER & CO.

May 3, 1950.

GOOD REASONS FOR A FAIR RETURN

The telephone man on the opposite page drives home some sound points.

A business must have money to expand so it can serve its customers better. Most of it must come from investors. Investors want a fair return for the use of their money. That fair return must come out of the profits of the business.

The advertisement describing the relation between profits, better service and a financially healthy telephone industry appears in national magazines during May.

An advertisement of the

BELL TELEPHONE SYSTEM

"What Makes It Good for Me?"

Charley, who owns a drug store, wants to know why he should care about a profit for the telephone company

The Scene—*A drug store in any one of thousands of cities and towns in the U. S. A.*

The Time—*Lunch time. A man from the telephone company has dropped in. He's chatting with his friend Charley, who owns the store.*

CHARLEY: "What d'ya mean — it's good for me when the telephone company makes a profit? You give me good service and all that but why should I care whether you make money or not? Besides, I'm having my own troubles here, trying to put in a bigger soda fountain."

AL: "What d'ya mean, 'trying'? Can't you just up and do it?"

CHARLEY: "I've got to find me a partner with some capital. These things cost money."

AL: "Sure they do! It's the same with us at the telephone company. To keep on giving you good service, and put in telephones for people who want them, we must have a lot more central office equipment and cable and other things. And to buy it, we have to get money from our partners — the stockholders. They expect a profit — just like your partner would."

CHARLEY: "I guess you're right. Nobody would invest his money here unless I could earn him a profit."

AL: "And here's something else, Charley. Those girls there at the end of the fountain. They're telephone girls. They're spending a part of their wages with you — putting money into your till to help you make a profit. Thousands of dollars of telephone payroll money are spent right in this town every week."

ADEQUATE RATES AND EARNINGS for the telephone company have a far-reaching effect. For only a strong and healthy telephone company can pay good wages, contribute to the prosperity of the community and provide an improving service for telephone users.

Only through adequate rates and earnings can the telephone company — like Al's friend Charley in the drug store — attract the new capital that is needed to carry on the business.

It's the dollars from investors — from hundreds of thousands of people in every section of the country — that build, improve and expand the best telephone service in the world for you to use at small cost.

BELL TELEPHONE SYSTEM

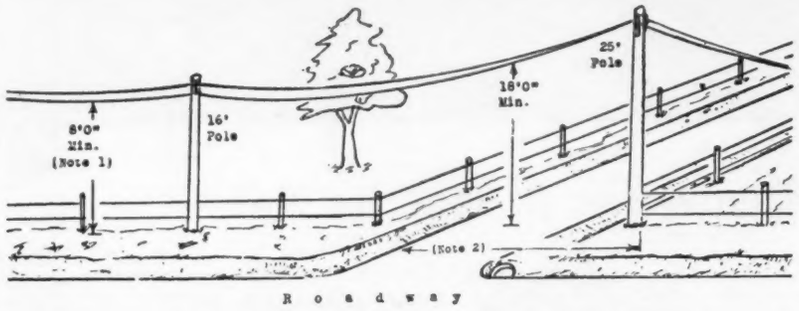


Fig. 20—Use of single tall pole to obtain desired minimum clearance over driveway from road. Notes: (1) This clearance should be 14' 0" if there are no obstructions to prevent passage of vehicles under the wires to and from the field. (2) See note under Figure 17.

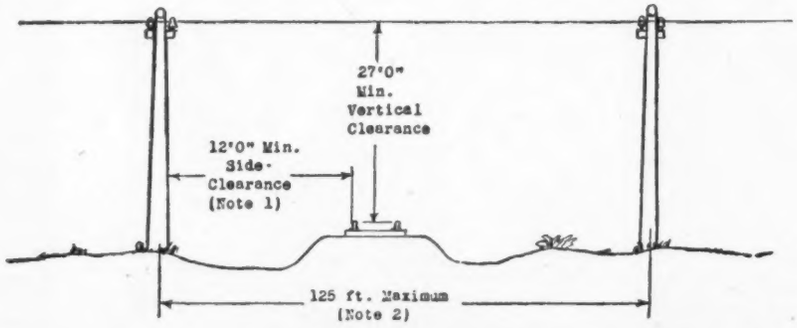
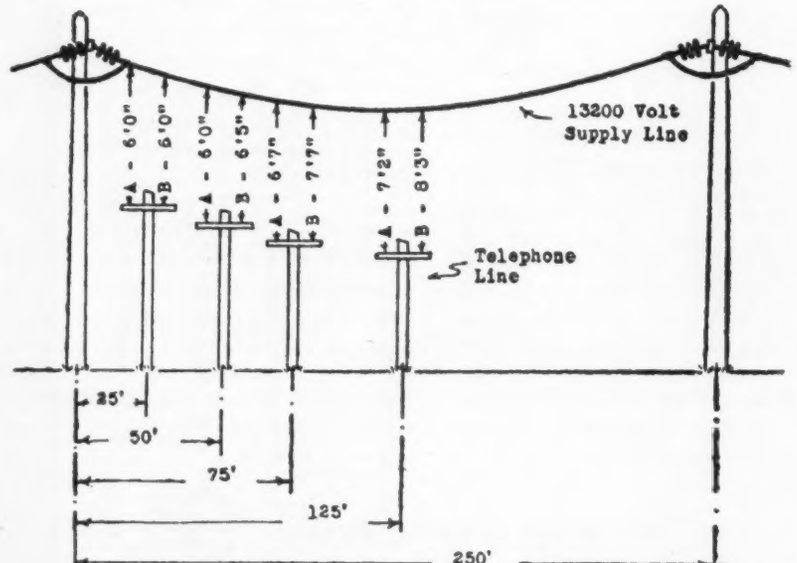


Fig. 21—Minimum required clearances at railroad crossings. Notes: (1) Minimum side clearances measured from nearest part of pole or guy. This side clearance may be reduced to 7' 0" at railroad sidings if sufficient space is left at driveways at loading and unloading points. Poles and guys must not interfere with clear view of railroad signals and signs. (2) Minimum for crossing span carrying 104 copper wires with the rest of the spans 109 steel line wire. It is advisable to make the crossing span 100 feet or less in length where practicable. (3) If a crossing is made via private right of way, the railroad company will specify the clearances to be obtained.



A=Large supply conductors—#6 solid copper, for example
B=Small supply conductors—#8 solid copper, for example

Fig. 23—Showing typical example of increase in minimum clearances required for telephone wires passing under power conductors.

Rebuilding

(*Continued from page 37*)

company to place the nearer pole of their crossing span as close as possible to the telephone line, since this location assures them a minimum pole height at the crossing over the telephone line and the roadway. Thus if the telephone line passes within fifty feet of the nearer power pole (but not less than 3'0" from the nearest telephone conductor to this pole, the minimum basic separation between the telephone and power wires need not be increased.

Another situation to be guarded against in the matter of exposure to power lines is the placing of telephone guys within the zone of exposure (Figure 24). A very common example of an exposure of this kind is an overhead guy from a telephone pole to a stub guy on the other side of the road on which is located a power line as indicated in Figure 25. At corners in a telephone lead, the exposure can be avoided in most cases by using a two-pole corner construction with down guys instead of a right-angle corner or buckarm construction, which requires two overhead guys. In the case of a branch-off on the field side of a telephone line from the main lead, the

PART FOUR
of Mr. Reed's Series
"Rebuilding The Rural Outside Plant"
Will Appear In The June
FORTNIGHTLY TELEPHONE ENGINEER

first pole of the spur should be guyed instead of the main lead pole to avoid the use of an overhead guy to stub pole on the other side of the road. The main lead pole is ground braced to reduce the side strain and, in addition, the first pole of the spur is placed about 20 feet from the main lead pole and guyed. The wires in this short span are strung with a somewhat greater sag than normal.

If for any reason, it is not possible to avoid placing a telephone guy in the zone of exposure to a power line, strain insulators should be inserted in the guy as indicated in *Figures* 24 *and* 25. If possible one insulator should be used to effect the proper

JOHN S. REED, Lincoln, Neb., author of "Rebuilding The Rural Outside Plant."

isolation of the telephone guy from a man working on the pole or from a person on the ground. The strain insulator is cut into the guy as illustrated in *Figure* 26. If a power guy crosses a telephone guy, the latter guy should have two strain insulators cut into it, one on each side of the power guy. Then, if one guy sags against the other the desired isolation will still be obtained.

The power groups, both public and private, are very conscientious in the matter of maintaining adequate clearances between electrical and telephone facilities and avoiding overbuilding telephone lines. They have come to realize that rural communities want good telephone service as well as dependable electric power and have found that considerable interference with telephone service resulting from inductive noise and frequent crosses does not set well with the telephone users. Furthermore, present telephone subscribers without electrical

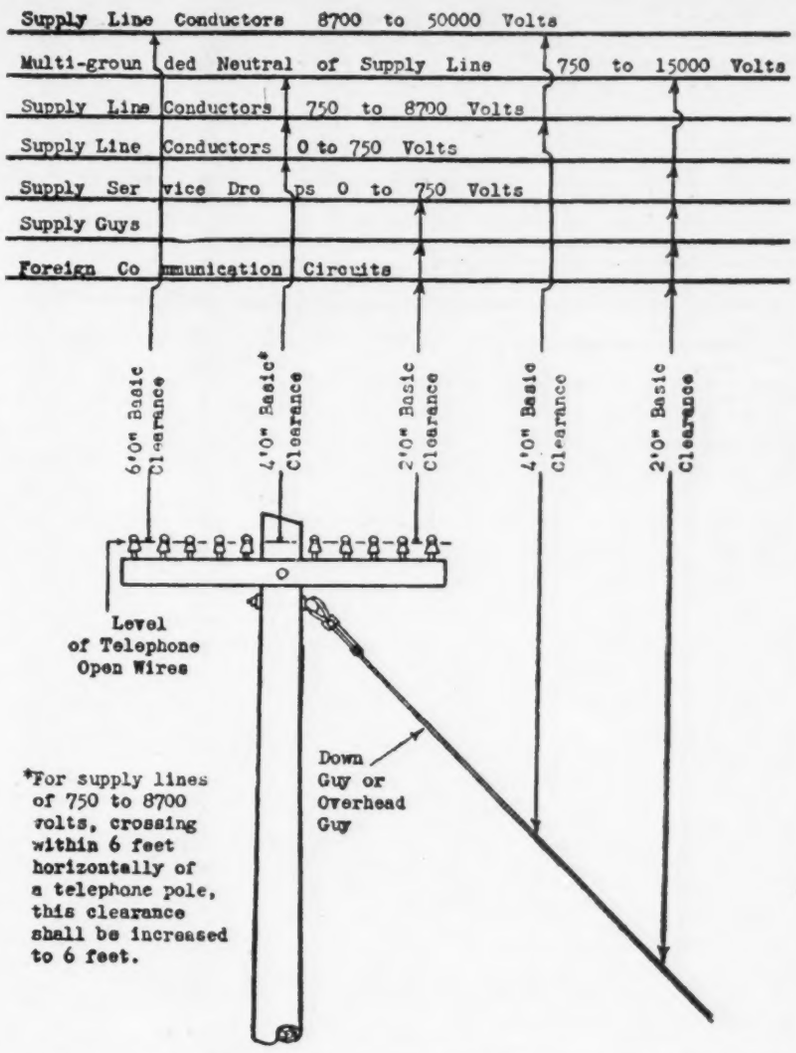

Supply Line Conductors 8700 to 50000 Volts
Multi-grounded Neutral of Supply Line 750 to 15000 Volts
Supply Line Conductors 750 to 8700 Volts
Supply Line Conductors 0 to 750 Volts
Supply Service Drops 0 to 750 Volts
Supply Guys
Foreign Communication Circuits
6'0" Basic Clearance
4'0" Basic* Clearance
2'0" Basic Clearance
4'0" Basic Clearance
2'0" Basic Clearance
Level of Telephone Open Wires
Down Guy or Overhead Guy
*For supply lines of 750 to 8700 volts, crossing within 6 feet horizontally of a telephone pole, this clearance shall be increased to 6 feet.

Fig. 22—Minimum basic clearances for telephone wires from power (supply) conductors.

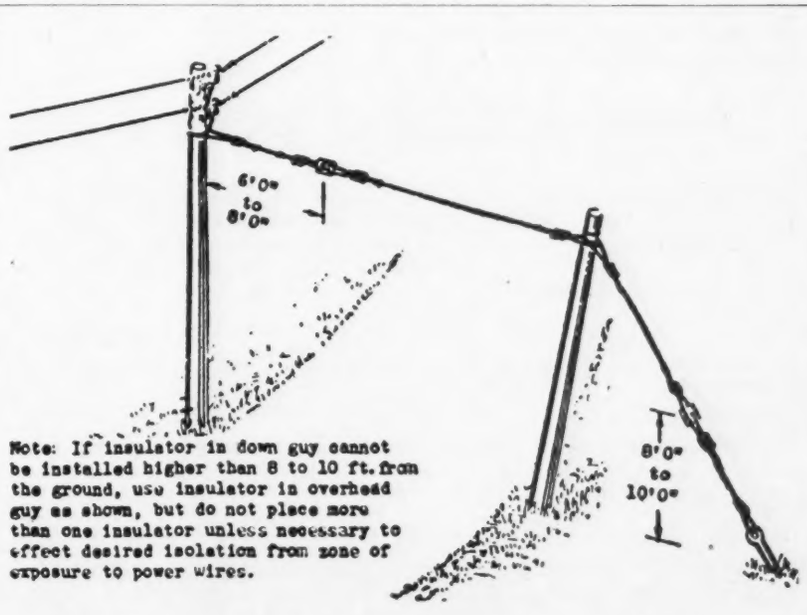

6'0" to 8'0"
8'0" to 10'0"
Note: If insulator in down guy cannot be installed higher than 8 to 10 ft. from the ground, use insulator in overhead guy as shown, but do not place more than one insulator unless necessary to effect desired isolation from zone of exposure to power wires.

Fig. 25—Use of strain insulators in overhead guy and in stub guy required due to guys being in zone of exposure to a power line.

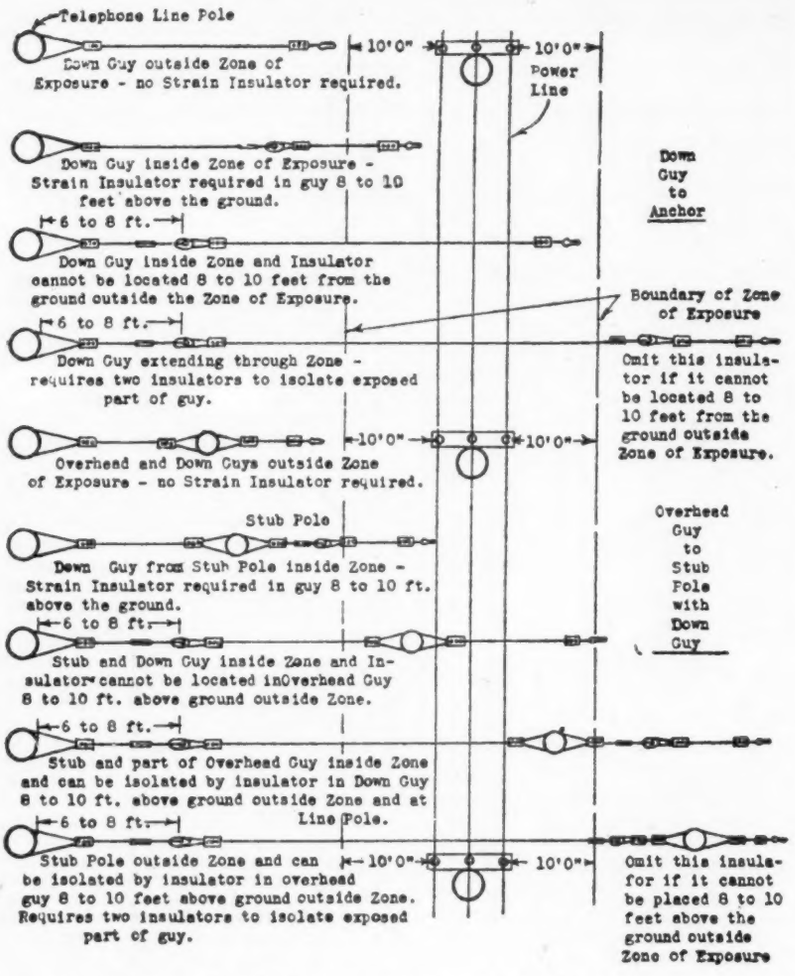

Telephone Line Pole
10'0"
10'0"
Power Line
Down Guy outside Zone of Exposure - no Strain Insulator required.
Down Guy inside Zone of Exposure - Strain Insulator required in guy 8 to 10 feet above the ground.
Down Guy to Anchor
6 to 8 ft.
Down Guy inside Zone and Insulator cannot be located 8 to 10 feet from the ground outside the Zone of Exposure.
Boundary of Zone of Exposure
Down Guy extending through Zone - requires two insulators to isolate exposed part of guy.
Omit this insulator if it cannot be located 8 to 10 feet from the ground outside Zone of Exposure.
Overhead and Down Guys outside Zone of Exposure - no Strain Insulator required.
Stub Pole
Overhead Guy to Stub Pole with Down Guy
Down Guy from Stub Pole inside Zone - Strain Insulator required in guy 8 to 10 ft. above the ground.
Stub and Down Guy inside Zone and Insulator cannot be located in 8 to 10 ft. above ground outside Zone.
Overhead Guy
Stub and part of Overhead Guy inside Zone and can be isolated by insulator in Down Guy 8 to 10 ft. above ground outside Zone and at Line Pole.
Stub Pole outside Zone and can be isolated by insulator in overhead guy 8 to 10 feet above ground outside Zone. Requires two insulators to isolate exposed part of guy.
Omit this insulator if it cannot be placed 8 to 10 feet above the ground outside Zone of Exposure

Fig. 24—Showing situations requiring strain insulators in down guy and in overhead guy to stub pole.

Make Tail 6" long. Serve with 5 turns 109 iron wire on strand and tail and 2 turns on strand only.
Make loop approximately equal to length of insulator.
One 1-bolt guy clamp on 2,200 pound, one 3-bolt clamp on 6,000 or 10,000 pound, or two 3-bolt clamps on 16,000 pound strand.

Size of Strand	300 to 5000 volts	Over 5000 up to 17000 Volts	Over 17000 up to 34000 Volts
2200- and 6000-lb.	No. 502	No. 516*	2 No. 516 in series
10000- and 16000-lb.	No. 504	No. 516*	2 No. 516* in series

**Wet process multi-fin insulator.*

Fig. 26—Method of connecting strain insulator in guy and sizes of insulators used.

facilities are often good prospects for connection to power lines being extended into their areas. This expansion of power facilities is of advantage to telephone companies, too, since a non-telephone subscriber that has had electrical service extended to his farm sooner or later wants telephone service as well.

If a telephone organization finds that it has problems of adequate separation from power facilities or inductive noise that cannot be cleared by its own efforts, it can seek help from the power company and be assured that this company will cooperate to the fullest extent.

Part IV of Mr. Reed's series will appear in the June, FORTNIGHTLY TELEPHONE ENGINEER and will discuss planning for adequate service.

K. Wood Elected V. P. New York Tel. Co.

Kennerly Woody, assistant vice president of the American Telephone & Telegraph Company in charge of advertising, was elected vice president-public relations of the New York Telephone Company at a recent meeting of the Board of Directors of that company.

He succeeds Wellington Powell, who becomes vice president and general manager of the Manhattan-Bronx-Westchester area.

W. A. Kietzman, formerly in charge of the area, becomes vice president in charge of staff operations for the company, succeeding Russell H. Hughes, who was appointed to a newly created office, vice president-revenues and regulatory matters.

At the same meeting, W. G. Hampton was elected vice president and general manager of the Long Island area, effective June 1. He succeeds A. G. Wright, head of that area for the last 10 years, who has reached retirement age under the Company plan.

Southern States Tel. Co. Completes Building Project

A new telephone building and expansion costing more than $17,000 has been completed at Jacksonville, Ark., by the Southern States Telephone Co., which has headquarters in Stuttgart, Ark. The first call over the new telephone exchange was made April 26, 1950.

Washington Bureau

(*Continued from page 30*)

trification work because of its showing that "follow-up" and assistance phases of the program were falling behind, and it would hardly be logical to diminish the electrification personnel total after reaching what is considered a satisfactory level.

In the House discussions of the Agriculture chapter of the omnibus funds bill, Rep. W. Robert Poage (D., Tex.), House "father" of the rural telephone legislation, made a short speech expressing "concern" about the REA telephone funds cutdown, but did not attempt to have it raised.

Rep. Poage, in conceding the Congressional economy sentiment, declared in his statement that "I know the United Treasury is not inexhaustible and I recognize that the committee was torn with the problem of trying to be fair to the taxpayers and at the same time provide adequately for these needed programs." He said he believes it will be "impossible to meet much of the need" for loans without the $50 million asked by the REA, which the committee reduced to $25 million. The administrative funds asked for the telephone program were cut from $2.1 million requested to $900,000 by the committee.

There was little debate about the rural telephone funds other than Rep. Poage's discussion, although Rep. Clifford Hope (R., Kans.), ranking minority member of the Agriculture Committee, declared that the funds "may not be sufficient" for the program, and that he feels "sure that if it should be demonstrated as time goes by that this appropriation is inadequate the members of the subcommittee will cooperate in securing" whatever additional funds may be needed.—THE END

National Electric Purchases I. A. Bennett & Co.

National Electric Products Corp. has purchased I. A. Bennett & Co., Chicago, for 46 years an exclusive sales agent in 15 midwestern states for the National line of electrical roughing-in materials.

R. C. Bennett, Jr., former general manager of the Bennett firm is now vice president and sales manager of National Electric.

BETTER . . .

. . . any way you look at it!

CHANCE STEEL 8-Way Cone Anchor. . .

Linemen or *Groundmen* like the Chance Steel Cone because it is light weight—easy to handle and the nut retainer makes it easy to install. *Foremen* and *Construction Superintendents* like it because rough treatment and heavy tamping won't break it. They save on installation time and get a good solid job Lighter weight, plus the fact that it stacks well makes the Steel Cone a favorite with *Storekeepers*. *Engineers* specify it because they can depend on steel and because the 8 flat wedging surfaces and the flaring base mean greater holding power. *Purchasing Agents* prefer it because they get all these advantages for *less* money—solid reasons for economy-minded *Management* men who demand lasting performance Yes, *any way you look at it*, the Chance 8-Way Steel Cone is the *best* Cone Anchor buy on the market.

You know it's RIGHT when you specify CHANCE

A·B·CHANCE CO·

CENTRALIA, MISSOURI · SAN FRANCISCO, CALIFORNIA

ABC INDUSTRIES

Sensational NEW LP*GAS TORCH with exclusive refill cylinder

3660°F CALCULATED FLAME

PORTABLE
No heavy tanks or hoses. Fits ordinary tool kit. Lightweight.

INSTANT LIGHTING
At any temperature

ECONOMICAL
Low first cost, low operating cost, no maintenance cost

Burner quickly and easily detached for "Cylinder refill"

TRADE PRICES

GAS FILLED CYLINDER $7.95
2 BURNERS—FIXED FLAME, ADJUSTABLE FLAME ea. 5.00
FILLED CYLINDER WITH BOTH BURNERS 15.95
LEAK DETECTOR BURNER 7.30
REFILL 1.00

CLEANS OWN ORIFICE IN 30 SECONDS! . . . refills easily obtainable . . . clean, non-oxidizing, non-carbonizing flame . . . long-burning . . . many other outstanding features . . . it's the Torch of the Century!

APPLICATIONS: Soldering • melting lead or babbitt • tinning • light brazing • freeing frozen nuts • dozens of other labor-saving applications where electricians need an intense, portable controlled flame.

ORDER THRU YOUR JOBBER

FREE FOLDER

OTTO BERNZ CO. INC.
Since 1876 "Always Reliable"
280 Lyell Ave. Rochester 6, N. Y.

TORCHES • FIREPOTS • PLUMBERS TOOLS

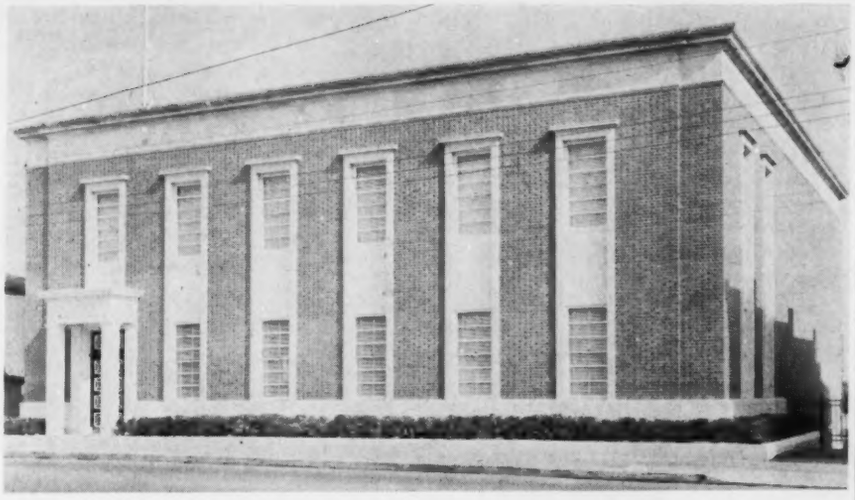
At the Charlottesville cutover: left to right—E. R. Girard, operating engineer, Automatic Electric Co.; A. C. Stratton, Atlanta branch manager, and J. D. Braddock, sales representative, Automatic Electric Sales Corp.; P. H. Lyday, division plant manager, Virginia Telephone & Telegraph Co.; J. E. Bowen, Charlottesville city manager; G. K. Tebell, Mayor of Charlottesville; L. D. Densmore, vice president, Central Telephone & Gas Co.; A. Knoon, installer, Automatic Electric Co.; D. T. Swanson, vice president and general manager, Virginia Telephone & Telegraph Co.; T. S. Gary, representing Gary Group, Chicago; V. L. Bunkleman, superintendent of installation, Automatic Electric Co.; and A. Shoemaker, Automatic Electric installer.

Charlottesville Converts To Automatic Operation

The recent cutover of the Charlottesville, Va. exchange of the Virginia Telephone & Telegraph Co. to automatic operation climaxed months of systematic planning that paved the way for a quick and efficient cutover.

The story of the Charlottesville dial conversion started in the late summer of 1945 when careful consideration was given to possibilities of including the change in the company's plans for service expansion and improvement. After many studies were prepared and the importance of all factors involved had been carefully considered, the decision to proceed with the conversion was made in 1946. This was the signal to "go ahead" with the preparation of further engineering and commercial

Mayor G. K. Tebell of Charlottesville, Va., places first toll call after Virginia Tel. & Tel. Co. completes conversion to automatic service, to Judson Large, Chicago, Ill. Standing left to right are: J. P. Borden, dist. mgr.; Duane T. Swanson, Eastern div'n. mgr.; Wilson B. Garnett, Eastern div'n. traffic mgr.; James E. Bowen, city manager at Charlottesville, and L. D. Densmore, vice president.



The new telephone building at Charlottesville, Va.

studies. Comprehensive traffic, plant and commerical studies and forecasts were carefully completed as essential guides for use when determining the capacity, size and characteristics of equipment required; and the company placed an order with Automatic Electric Sales Corp., Chicago, Ill., for 5,400 lines of Strowger Step-by-Step Dial Equipment.

Charlottesville's conversion presented some unusually involved problems, since it became evident that new quarters would be required necessitating one or two new buildings which, as it later developed, would have to be located a half mile or more from the old buildings. It was not until the spring of 1947 that the company's board of directors selected a location at 417-419 West Main Street. In spite of many problems of immediate post-war construction such as material shortages, strikes, etc., Charlottesville's new telephone building was ready for the dial equipment on August 13, 1949 and for complete occupancy that fall.

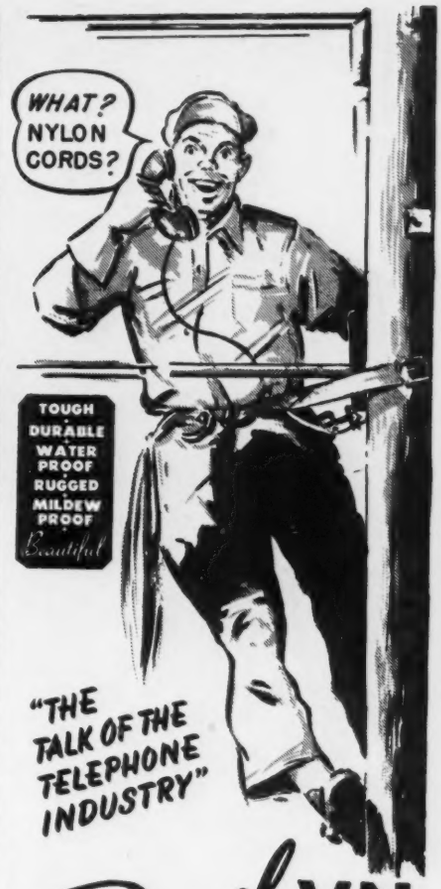
Paving the way for heavy underground feeder cables to follow, 12,624 trench feet of underground conduit system was placed. Toll tie cable between the new office and the A. T. & T. repeater station, the company's point of connection for long haul toll circuits, was provided to take care of the expected increase in toll circuits, from less than 100 to 250 by 1965. In view of a station growth from 3,926 in 1931, to over 10,000 in 1949—before conversion, and the considerable further growth which is expected, approximately 60 miles of aerial and underground cable was placed to provide subscriber line facilities. Due to heavy saturation in surrounding rural areas and because of the many estates with consequent demand for higher grades of service, some exchange cables were extended into rural areas for distances up to 10 miles. Miles of pole line were also extended into outlying areas and all rural telephones under dial operation were provided with high grade common battery talking circuits. All telephones not of the hand-set type were replaced with modern dial equipped combination handsets and the approximately 6,000 handsets already in service were equipped with dials.

On "cutover day," the day all efforts had been pointed toward, there seemed to be no last minute details, all had been done; the building completed and occupied, equipment installed and tested, plant rebuilt and replaced, personnel trained and ready.

On the Monday following the cutover, Charlottesville experienced its biggest day, handling more local and toll calls than ever before in its history. By the end of that week toll operating, which now included dialing to and through several hundred cities and towns—and in over 100 of these exchanges, actually dialing the called station was routine. In less than two weeks after "cut over" plant forces had started installing held orders, extending cable to remaining new areas and regrading service, and commercial personnel were ready to start "selling" service.

Southwest Arkansas Co. Files For Incorporation

The Southwest Arkansas Telephone Company, Inc., Glenwood, Ark., has filed articles of incorporation with the office of the secretary of state, Little Rock, to operate telephone exchanges in Glenwood, Norman, Amity and Mount Ida, Ark. Incorporators are Doris R. Straughn, High D. Straughn and Marion C. Straughn.



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Nebraska Convention

(*Continued from page 46*)

150 meetings there in 1949, Mr. Pearce said.

Harold A. Palmer, chairman of the Nebraska State Railway Commission, told convention delegates that "progress can be made only by attracting investment capital" to the telephone companies.

"While we are discussing a rate case it might be well to focus attention on the important part a wage scale plays in determining total operating cost. The attention of every telephone company, although all of them were not directly affected, has recently been drawn to the federal legislation composed in an amendment to the Fair Labor Standards Act. I am referring to the so-called "Minimum Wage Law" which only became effective on January 25, 1950. The public is looking for a satisfactory solution, more and more as we go along, to public utility strikes, wage adjustments, and resultant rate revisions. The important question in some jurisdictions appears to be: If it is necessary for a regulatory Commission to consider the wage scale in operating costs and should not that same Commission also participate in the wage scale adjustment?

"Among various utilities under our jurisdiction it often happens that after wage adjustments have been made it becomes necessary to obtain an increase in rates in order to meet the new demands. I only opened this question for your meditation and it is not my intention to reflect any decided opinion of the whole Commission. It is not the purpose here to discuss the merits or demerits of such portent which might face us. It is not possible to enforce laws without support of public opinion and on the other hand, legislation is usually molded from public opinion. . . ."

Mr. Palmer emphasized that since plant expansion and replacement is a continuing process, the capital problem will be present until corrective measures are taken.

"Finally, there should be some margin of earnings, over and above that required for merely maintaining the physical condition of the country's industrial plant and machinery to finance long-term growth. In the ten years since 1939 the population of this country has grown from 131,000,000 to nearly 150,000,000. The unparalleled progress made in raising the American standard of living by expanding production and lowering costs has been made possible only by an economic system that has constantly attracted a stream of new investment capital into power equipment for making work easier and more productive—in factories and public utility plants, on farms and railroads, in offices and in homes. Not only is this needed for supplying the wants of the people, but the very security of the nation depends upon it, as was demonstrated so effectively during the last war."

R. C. Reno, editor of "Telephony," touched on a number of key problems confronting not only the industry but business as a whole during his address discussing "Preserving Freedom Is A Full Time Job." He graphically brought out the fact that this country has the finest telephone system in the world because telephone men and women have been free to work and serve under the American Free Enterprise System.

Ray W. Smith, president and editor of Telephone Engineer Publishing Corp., Chicago, addressed the convention on the subject "Some Observations of a Telephone Magazine

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Editor." Mr. Smith stressed particularly the need for "more and better service" with rates compensatory for the service rendered. He warned against the gradual disappearance of small telephone companies and urged the better service program as a means of survival.

Clyde S. Bailey, executive vice president of the U. S. Independent Telephone Association gave a fine exposition on the various activities of the National Association and the various problems confronting the telephone industry. He predicted that within 10 years Independent Companies would be serving over 10 million subscribers.

Speaking on the subject of "Improving Business-Government Relations," Francis X. Welch, Washington, D. C., stressed the need for greater thought on the part of telephone people in the great uncharted field of Human Relations. He emphasized the need for directing all possible attention on the encroachment of government into the realm of private enterprise. He urged that no effort be spared by the leaders of the telephone industry in helping to establish an improved business-government relationship and in keeping the Government camel's nose outside the tent of private enterprise.

The splendid convention program was concluded by W. V. Murchie of St. Joseph, Mo., who gave an entertaining running discourse which combined the elements of home-spun philosophy and even a few good traveling salesmen jokes.

At the board meeting, Otto Fuerst, Scottsbluff; R. C. Hunt, Blair, and H. D. Thompson, Wisner were re-elected to the board of directors. Other directors elected were Emil Volske, Stanton, to replace Mark D. Young, resigned; J. W. Hudson, to succeed D. M. Davis, resigned; and K. L. Schroeder, Columbus, to succeed G. A. Klein, resigned. Merle M. Hale was elected president for 1950; Robert C. Hunt as vice president, and George M. Kloidy as secretary-treasurer.

Mrs. Mayme Workman, executive secretary of the Independent Telephone Pioneer Association conducted a special traffic conference which drew a large attendance. She was assisted by Miss Roma Roth, Omaha, Neb., and Miss Merlie Markuson, Lincoln. Various traffic practices were discussed and an excellent talk on the importance of courtesy was presented by Miss Roth. Another outstanding talk was given by Miss Markuson on the subject of "toll completion."

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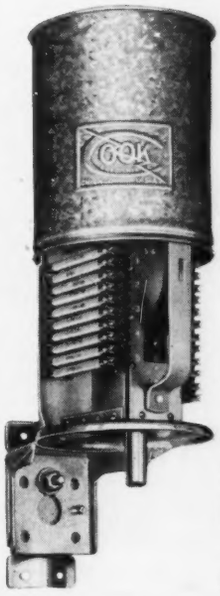

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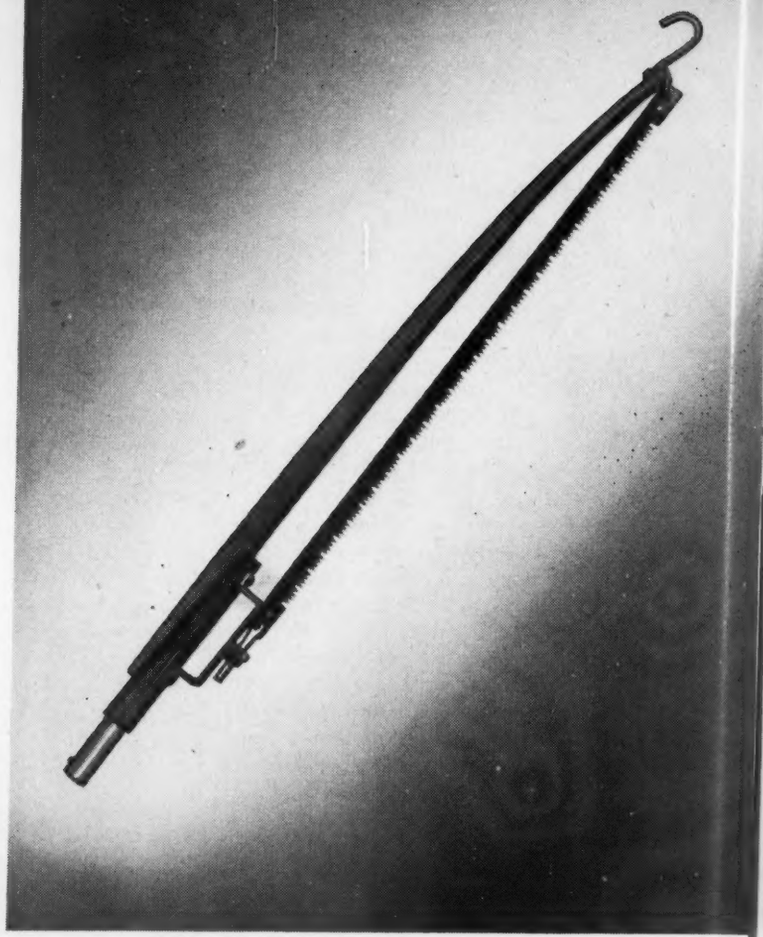

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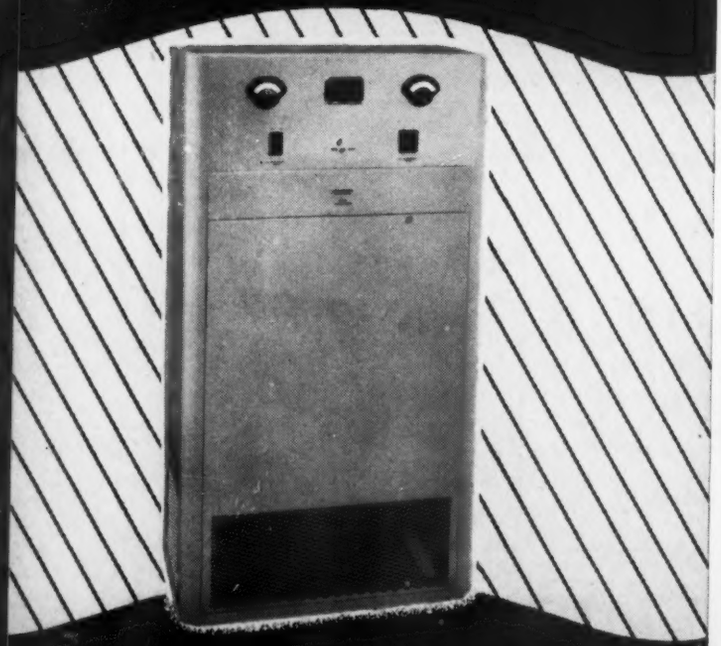

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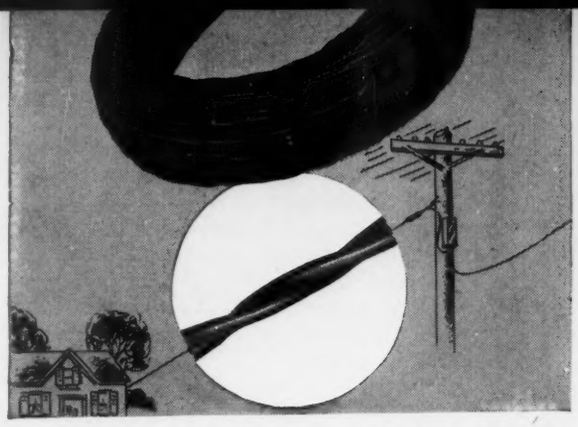

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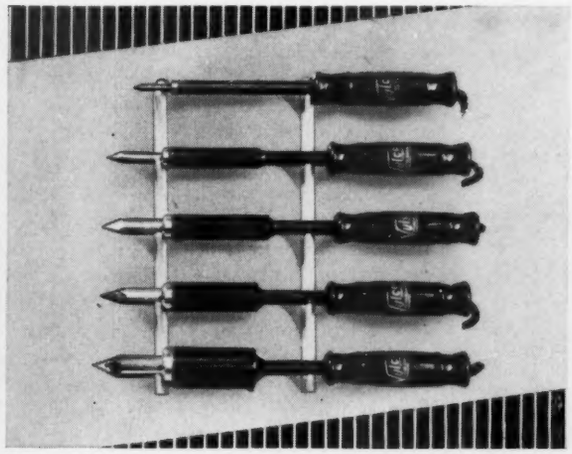
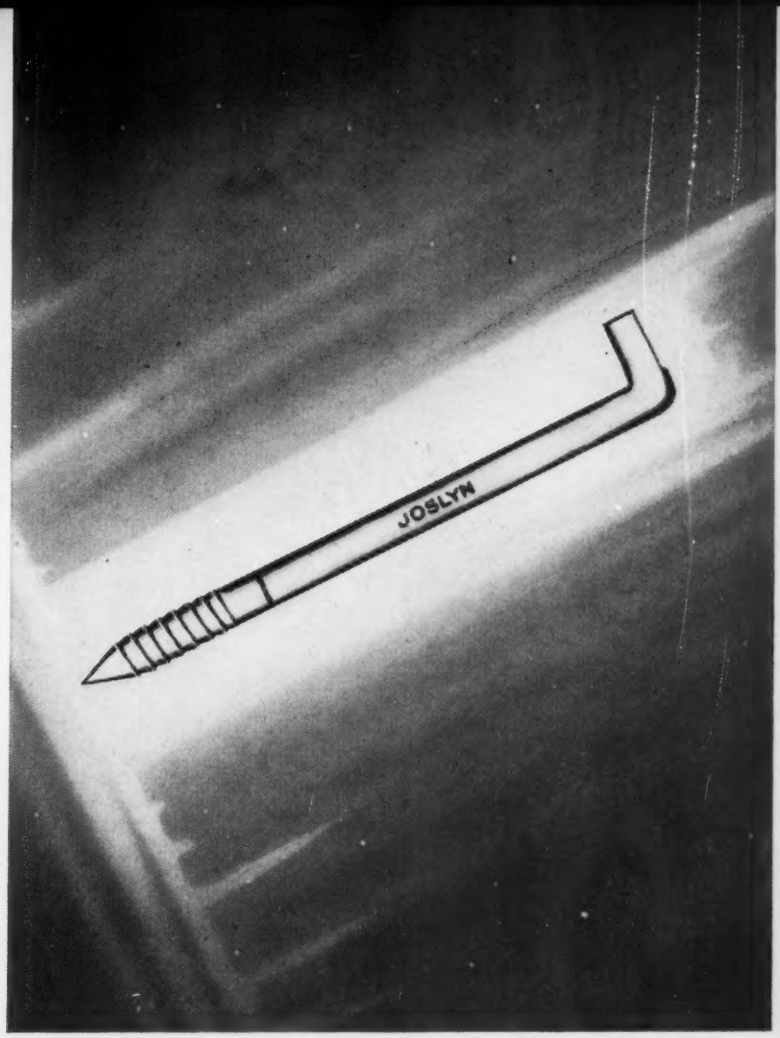


Make your next selection of soldering irons from the famous Vulcan line that includes both plug tip, above, or screw tip. Correctly designed for the steady production and constant delivery of ample heat—operates from either direct or alternating current. Available in 8 sizes. Made by VULCAN ELECTRIC CO.



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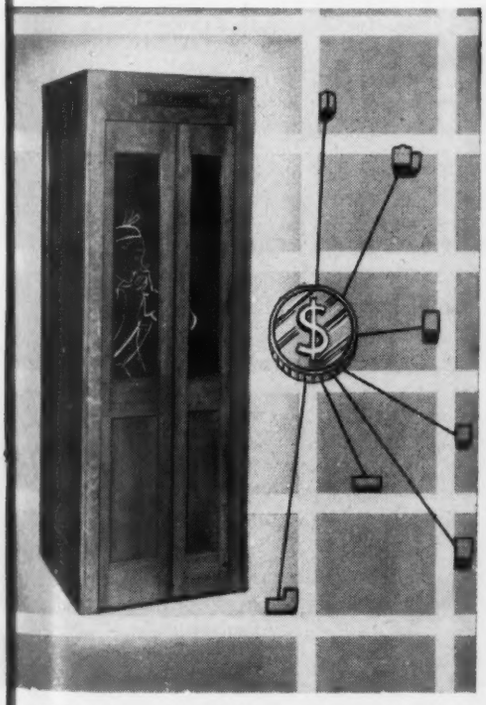

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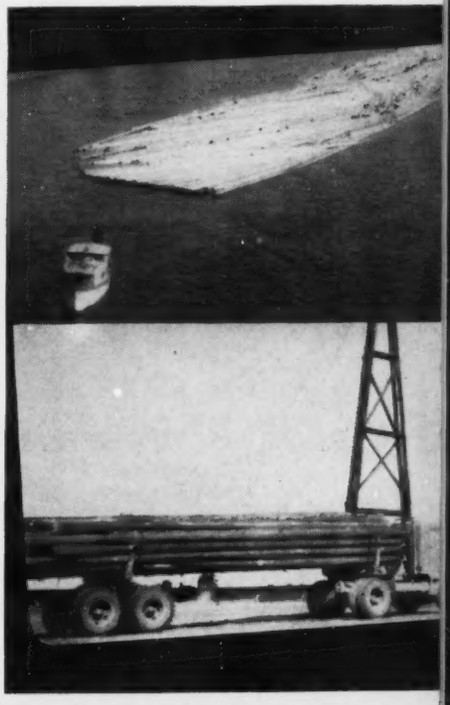

Famous for Strength and Durability, Northern White and Western Red Cedar poles flow toward the MacGILLIS & GIBBS CO. plants in a steady stream. There they're processed and creosote-treated to insure longer life. Order them now and watch replacement costs drop!

(Continued from page 43)

power single-channel two-terminal radio link installed in existing central-office buildings is estimated to be about $4,800 for VHF equipment, $5,400 for UHF equipment, and about $12,400 for microwave equipment at the present time. Work is now underway, however, by at least one equipment manufacturer to produce appreciably lower priced microwave equipment. These costs contain all expenses necessary to completely install the system and have it ready to test and place in commercial operation. Thus, antennas, poles, guys, anchors, labor, etc., are included.

First Cost Of Three-Channel Radiotelephone System

THE FIRST cost for a three-channel system made up of a radio link and short-haul carrier systems is similarly estimated to be about $7,850 for VHF equipment, $8,450 for UHF equipment, and $15,450 for microwave equipment. This is obtained by adding two channels of short-haul carrier equipment at $1,525 per channel to the above first costs.

Since the equipment involved is relatively new, it is difficult to make any exact statement with regard to life based on actual experience. In FCC Public Notice 44889, dated January 4, 1950, the Commission adopted an average service life of central-office radiotelephone equipment of 15 years, with a net salvage value of 5%, resulting in a depreciation rate of 6.3%. Until experience proves otherwise, this seems a reasonable figure to use.

Experience to date with point-to-point radio equipment in actual service in the telephone field has been too limited to permit the development of accurate figures as to maintenance and repair costs. Extrapolating from experience with various radio systems, a rough estimate of annual maintenance and repair costs for the radio link (including power consumption) of 10% of its installed first cost is made for the UHF and microwave equipments. Similarly, a rough estimate of 7% of installed first cost is made for annual maintenance and repair costs for the VHF equipment and 5% for the channelizing carriers.

Comparison Of First Cost And Maintenance Cost Between Radio Links And Wire Lines

Undoubtedly the best basis for comparison between radio links and wire construction would be the total annual cost for each. That cost is a function of first cost, depreciation rate, annual maintenance and repair cost, and various smaller miscellaneous charges. The first cost for the various radio equipments is known fairly accurately. The life of the equipment, and hence the depreciation rate, is merely an estimate, while the annual maintenance and repair cost is, at best, an "educated guess" due to the relative newness of this type of equipment. Therefore, rather than make a comparison between total annual costs, it was decided at this time to compare only two of the major factors entering into this cost, that is, the first cost and the annual maintenance cost.

In comparing first and maintenance costs between radio links and wire lines, the scope of comparison will be limited to average conditions. Thus, flat terrain will be assumed which will limit the range of the radio link to about 25 miles with normal antenna heights (75 feet).

Since the cost of a single "hop" radio link is fixed, regardless of distance, while the cost of wire-line construction increases linearly with distance, it is apparent that at some point the costs must cross. If the radio system is, indeed, competitive, this crossover point will occur within the range wherein the radio equipment will operate satisfactorily. Then for all circuit distances between the crossover point and limit of range the radio equipment has the lower cost, while for all distances from zero to the crossover point the wire-line construction has the lower cost. Thus, the lower the crossover point the more applications will be found for the radio link. (Speaking of cost per circuit mile for a radio link is meaningless, since the cost is essentially the same for one mile or 25 miles).

Fig. 5—First Cost Crossover Points

Type of Radio Link	No. of Circuits Required 1	2A	2	3	4	5A	5	6	7
1) Completely New Pole Line Construction									
VHF	5.5	—	6.0	7.3	7.5	—	7.6	8.5	8.5
UHF	6.1	—	6.5	7.9	7.9	—	8.0	8.9	8.9
Microwave	14.1	—	13.2	14.3	13.5	—	12.9	13.8	13.2
2) New Cross Arms and Wire Added to Existing Poles									
VHF	11.5	14.4	10.6	12.7	11.8	13.3	11.2	12.5	11.9
UHF	12.9	15.8	11.6	13.6	12.5	14.1	11.8	13.1	12.4
Microwave	29.7	31.8	23.4	25.0	21.3	22.6	19.0	20.0	18.3
3) New Wire Only									
VHF	26.8	31.6	17.7	20.7	16.8	18.8	14.8	16.4	—
UHF	30.1	34.6	19.3	22.3	17.9	19.9	15.6	17.2	—
Microwave	69.2	69.6	39.0	40.8	30.4	32.0	25.0	26.4	—

Note 1: "A" after number of circuits indicates that a non-phantomed existing physical circuit is free for use in a phantom group so that two new circuits can be obtained by adding only one pair of wires.

Note 2: Crossover points are given in miles. Radio has lower cost for all mileages between crossover point and 25 miles.

Note 3: Crossover points above 25 miles indicate that "single hop" radio links cannot be proven within their normal operating range.

Single-Channel System

IN GENERAL, the least expensive method of obtaining a *single* additional toll circuit on an *existing pole lead* is either by means of additional wire or short-haul carrier systems. The comparison between radio and wire-line costs becomes more favorable to radio where completely new pole-line construction is necessary or where new cross arms as well as wire have to be added to existing poles or where more than one or two additional circuits are needed. In many cases there is a limit to which additional wire or carriers may be employed on an existing pole lead, and neither of them is of any use where extension of existing facilities is required. Thus, in providing telephone service to distant rural areas or toll service between communities

where new construction is needed, radio should be seriously considered.

Fig. 1 plots the first costs for both wire-line and radio-link construction. From this it can be seen that where new cross arms and wire must be added to obtain a single circuit, the crossover point occurs at 11½ miles for a VHF link and at 13 miles for a UHF link, while the microwave equipment could not compete economically up to the maximum range of the equipment. If completely new pole-line construction were necessary, the VHF link would prove in above 5½ miles, the UHF link above about 6 miles, while the microwave equipment would prove in above about 14 miles.

The same line of reasoning about crossover points holds true for maintenance costs. *Fig.* 2 plots the estimated maintenance and repair cost for a wire line and for radio links. From this it can be seen that maintenance and operating costs for a VHF radio link are lower than on a wire line with new cross arms and wire for circuit lengths from about 12 miles to the single "hop" limit of the radio equipment. The crossover point for the UHF link occurs at 20 miles. In the case of completely new pole-line construction, the VHF equipment proves in beyond about 7-½ miles and UHF equipment beyond 12 miles. In neither case is the microwave equipment maintenance less than that for wire line.

Three-Channel System

THE FOREGOING was for a single circuit. In order to see how figures compare for a higher number of circuits, a three-channel system is also considered. For wire-line construction this is made up of two wire circuits plus a phantom, while in the radio link it is made up of the radio equipment plus two short-haul carrier circuits. *Fig.* 3 plots the first costs for such a three-channel wire and radio system, while Fig. 4 gives the estimated maintenance and repair costs.

Multi-Channel Systems

FIG. 1-4 have been used to graphically illustrate the idea of a crossover point. This point for the various radio-carrier link wire-line construction combinations can be found in a more simple manner for any number of circuits by dividing the cost of the radio-carrier link in question by the cost per mile for the contemplated wire construction.

For the sake of completeness, the first cost crossover points for up to seven circuits and for all possible radio-carrier wire-line combinations

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have been tabulated in *Fig.* 5, while the annual maintenance cost crossover points appear in *Fig.* 6. With regard to these tables, suffice it to say that the more circuits required (up to limit of seven) the lower the crossover point, particularly in the case of annual maintenance costs. This means that as more circuits than one or two are needed, the easier it is to prove in the radio-carrier method of obtaining them.

Experience With Point-To-Point Radio Links

THE EXPERIENCE with radio links in the General Telephone System up to the present time has been largely of an experimental nature with no installation being left in commercial service for an extended period of time.

Single-Channel Systems

ONE SINGLE-channel VHF radio link, utilizing RCA equipment, was used in Texas by the Southwestern Associated Telephone Company to provide temporary communication between Port Lavaca and an industrial plant located across Matagorda Bay pending laying of a submarine cable beteen the two locations. The distance involved was only about six miles. This radio link was in operation for a period of sixty days during which time an average of about 13 calls per working day was handled.

Another use of the single-channel VHF radio link was made by the Southwestern Associated Telephone Company during the ice storm that struck the Southwest early in 1949. Due to this storm, emergency toll service was needed between Eunice and Hobbs, New Mexico. The airline distance between these two points is about twenty miles. Within less than 48 hours antenna poles were set, the radio equipment installed, and commercial service started. The pole heights used were 50 and 60 feet. The equipment was in service for a period of 16 days and an average of 57 calls passed over the equipment per day with a peak load of 102 calls in one day. *Fig.* 7 shows a photograph of the type of equipment used in these installations.

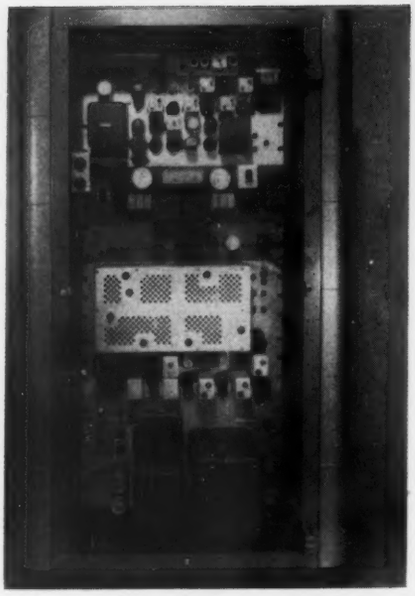

Fig. 7—Type of equipment used by the Southwestern Associated Telephone Co. to establish emergency toll service between Eunice and Hobbs, N. M.

Four-Channel Systems

The General Telephone Service Corporation has conducted experi-

(*Please turn to page* 64)

Fig 6—Annual Maintenance Charge Crossover Points

Type of Radio Link	1	2A	No. of Circuits Required 2	3	4	5A	5	6	7
1) Completely New Pole Line Construction									
VHF	7.3	—	6.4	7.4	6.7	—	6.3	6.9	6.5
UHF	11.8	—	9.6	10.5	9.1	—	8.3	8.8	8.2
Microwave	27.0	—	20.6	21.1	17.5	—	15.2	15.6	13.9
2) New Cross Arms and Wire Added to Existing Poles									
VHF	12.4	14.2	9.2	10.4	8.7	9.5	7.7	8.4	7.7
UHF	20.0	21.2	13.7	14.7	11.8	12.6	10.2	10.8	9.7
Microwave	46.0	45.4	29.2	29.6	22.6	23.0	18.6	19.1	16.5
3) New Wire Only									
VHF	18.7	20.6	11.4	12.8	10.1	11.0	8.7	9.4	—
UHF	30.0	30.8	17.1	18.2	13.7	14.5	11.4	12.1	—
Microwave	68.9	65.8	36.6	36.7	26.2	26.6	20.9	21.4	—

Note 1: "A" after number of circuits indicates that a non-phantomed existing physical circuit is free for use in a phantom group so that two new circuits can be obtained by adding only one pair of wires.

Note 2: Crossover points are given in miles. Radio has lower cost for all mileages between crossover point and 25 miles.

Note 3: Crossover points above 25 miles indicate that "single hop" radio links cannot be proven in within their normal operating range.

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high-potential lightning arrester

Outdoor pole type arrester provides lightning protection and atmospheric static drain for five pairs of open-wire circuits, or for drop wires and cables leading to unprotected terminals.

Equipped with:

1. Single piece molded Bakelite insulation and fanning strip for strength and high resistance. Fanning strip is closed with a thin film of Bakelite until drops are run.
2. Non-corrosive metal hood, Everdur studs and galvanized mounting bracket for long service life.
3. Phosphor-bronze spring clips to accommodate Cook Tru-Gap non-grounding lightning dischargers.

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These qualities, more important now than ever before, are assured through the constant supervision of America's largest dry battery laboratory.

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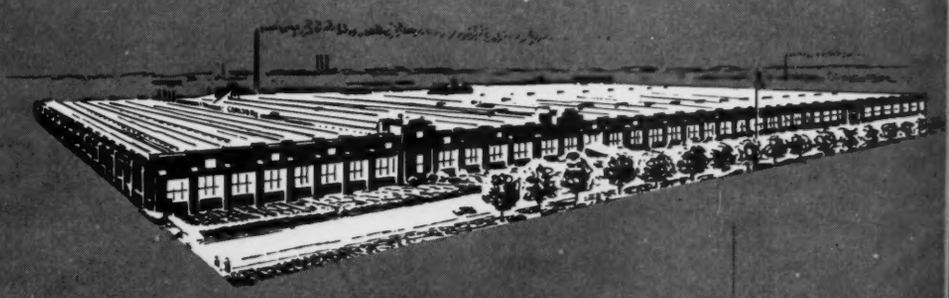

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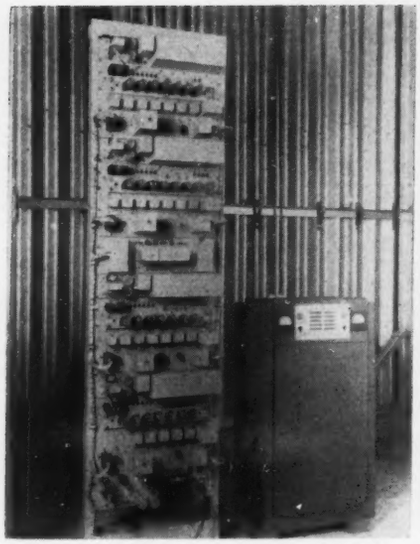

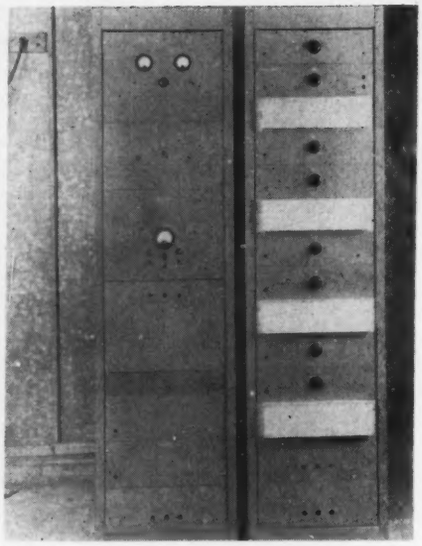

Figs. 8-9—Four channel V H F radio link equipment and four-channel microwave equipment used in experimental tests.

mental tests with both a four-channel VHF radio link and a four-channel microwave link. The four-channel VHF equipment was obtained on a developmental contract placed with the Stromberg-Carlson Company and uses Link radio equipment. The four-channel microwave equipment was obtained on a similar contract placed with the Raytheon Manufacturing Company. Photographs of these equipments are shown in *Figures* 8 *and* 9 respectively. The VHF radio equipment for one terminal is contained in a metal cabinet about three feet in height and the channelizing equipment is contained in a six-foot high telephone-type rack. In addition to this equipment, each terminal must be equipped with two antennas —one for the radio transmitter and one for the radio receiver. A typical VHF antenna array is shown in *Fig.* 10. The microwave-radio equipment is contained in a relay-rack cabinet 77″ high, and its associated channelizing equipment is contained in another similar cabinet. A typical antenna installation for a microwave system is shown in *Fig.* 11. The channelizing equipment shown with the microwave equipment requires a 30-kc band to provide the additional three channels (above the straight through voice path), while the channelizing equipment shown with the VHF equipment provides the additional three channels in a 16-kc band.

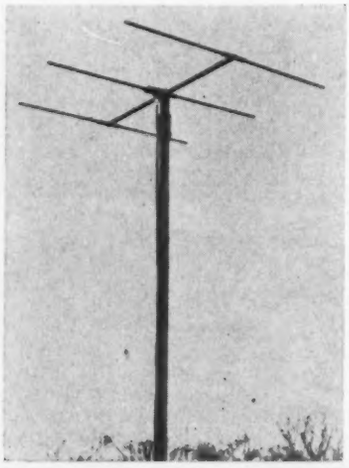

Fig. 10—Typical V H F antenna array.

These equipments were operated over a path 26 miles long that provided "radio line-of-sight" conditions. Four good speech channels, complete with ringdown signaling and with acceptable noise levels, were obtained from both the VHF and microwave equipment. The equipment was operated under an experimental license, and this precluded the possibility of commercial service. Experimentally the VHF equipment has been operated on and off for a period of about one and one-half years and the microwave equipment for about one year, and no trouble has been encountered with either equipment other than an occasional tube failure. Now that the experimental tests have been completed, it is planned to place them in continuous commercial operation so that information on behavior under prolonged service conditions may be obtained.

Conclusions

THE USE of simple radio links to handle small volumes of toll traffic is practical at the present time. Two radio frequencies are required for each radio link, and these can be used to provide from one to seven toll circuits by the addition of channels of a three-"story" short-haul carrier system or by means of special channelizing equipment. By using more than one radio link, greater volumes of traffic can be handled. In addition to its flexibility, this method of handling larger circuit volumes has another advantage over use of more complex, high capacity radio equipment in that the temporary destruction or loss of a single radio link does not disable all of the toll circuits, but only a portion of them. Hence the need for standby equipment is eliminated as traffic can be routed over the operating radio links while the faulty equipment is repaired. Of course, the number of frequencies assigned limits the number of radio links that can operate in any one region. While for a very large number of circuits the more complex, high capacity radio link will probably prove more economical for small and medium traffic volumes, the simple radio links appear more advantageous.

A maximum single "hop" distance of 25 miles over flat terrain is all that is to be expected of normal radio equipment with 75-foot antenna heights, although circuits many times this length may be obtained by use of radio-frequency repeater stations.

Equipment operating in the VHF-UHF region is more attractive economically at the present time than that operating in the microwave region. However, some new microwave equipment now in the state of development shows promise of lowering the price of microwave apparatus to an extent where it will become much

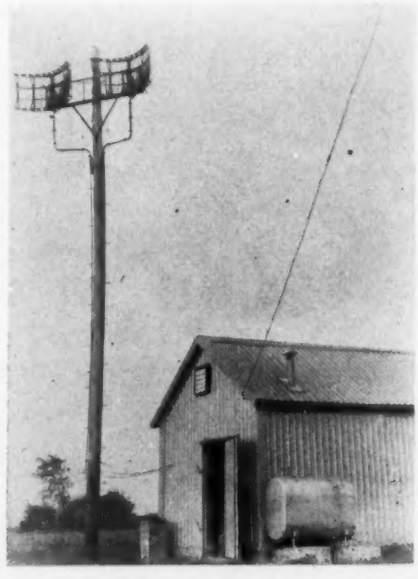

Fig. 11—Typical antenna for a microwave system.

more competitive. It must be remembered that while the common-carrier frequency assignments for *point-to-point* service in the *VHF-UHF* region are on a *secondary* basis, those in the *microwave region* are on a *primary basis.* Also the immunity of microwave circuits to outside interference must be considered.

As can be seen from the tables given in *Figures* 5 *and* 6, there are a great many situations in which, both on a basis of first and annual maintenance costs, radio-toll links will prove in over wire-line construction, and it seems most probable that in those cases it will also prove in on a basis of total annual cost.

While radio cannot and should not be considered a panacea for all toll problems, it is an additional means for providing toll circuits and is, even today, able to compete economically with wire-line construction in many instances. The future should see it become an even more useful tool.—THE END.

Donald C. Power Elected to General Board

Donald C. Power of Columbus, Ohio was elected to the board of directors of General Telephone Corp. at the annual stockholders' meeting. Mr. Power, a member of the law firm of Power, McConnaughey & Griffith,

DONALD C. POWER

has been practicing public utility law since 1926. He also is a director of Ohio Associated Tel. Co., a General Telephone subsidiary, and for the last two years has served as associate rate counsel for most of the other General Telephone subsidiaries.

All other directors were re-elected, namely, Thomas A. Boyd, Harold V.

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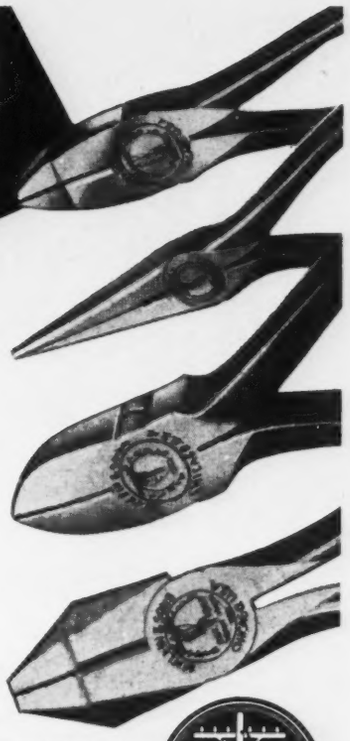
the Best



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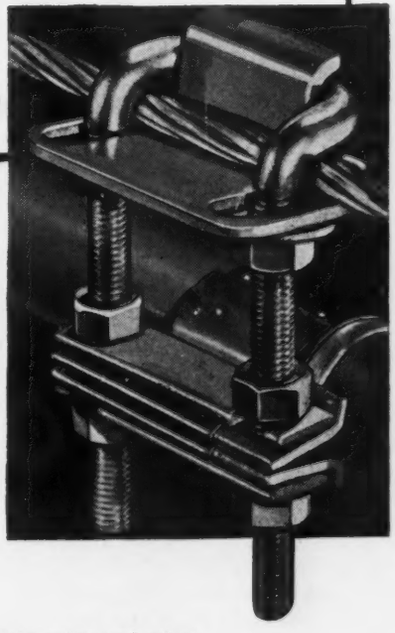

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Reduce hours of work to minutes on all pole straightening jobs with the new Coffing Pole Straightener. This compact, highly portable tool sets up quickly — anywhere . . . jacks bent or leaning poles into upright position, holds steadily while base is tamped. Extensions on push bar give choice of any desired length for all conditions. Attachment with removable pike quickly adapts push bar for use on either steel or wooden poles.

Without push bar attachment, this handy tool becomes a powerful high-lift jack. Remove upper part from stand and you can bind poles, pull wire and do the countless lifting and pulling jobs on line maintenance. Find out more about the new Coffing Pole Straightener and other utility maintenance tools listed at the right. For complete information write Dept. U5.

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Bozell, Edwin F. Chinlund, Robert A. Gantt, George E. Jones, Morris F. La Croix, Herbert L. Nichols, G. Herbert Semler, Russell B. Stearns, Gardiner Symonds and Pearson Winslow. Mr. LaCroix will continue as chairman of the board.

At the organization meeting of the board following the stockholders' meeting, all officers of the company were re-elected. They are: Mr. Bozell, president; Mr. Boyd, vice president; F. E. Norris, vice president; Robert F. Briggs, secretary and treasurer; Raymond E. Dolar, comptroller; Sherman C. Wilcox, assistant secretary and assistant treasurer; and Ruth A. Segner, assistant secretary.

R. E. Williams Joins Staff of Automatic Electric

Robert E. Williams, for the past several years identified in various executive and administrative capacities with the Telephone Operating Division of the Gary Group, has been appointed staff representative for Automatic Electric Co., Chicago. In his new position, as a member of the staff of H. F. Lello, vice president and

R. E. WILLIAMS

general manager, Mr. Williams will act in an advisory capacity to the company's customers in the Independent field on matters relating to financing, accounting, rates, and other matters in which his broad telephone experience may prove beneficial.

Mr. Williams' connection with the Gary Group dates from 1927 when he joined the Theodore Gary & Co. organization in Kansas City. In this position he handled various fiscal and corporate assignments following the formation of Associated Telephone & Telegraph Co. and Telephone Bond

& Share Co.—the two principal parent units of the Gary Group.

During the following several years, Mr. Williams held a number of positions in both the parent and affiliated companies of the Gary Group, acting in both fiscal and corporate matters in Kansas City and Chicago. In 1939, he went to Fort Wayne as a member of the staff of Telephone Services Inc., then the operating service center for the domestic operating telephone companies of the Gary Group.

Since 1945, Mr. Williams has made his headquarters in Chicago, where he assumed broadened duties in connection with the operation of Gary Group operating telephone companies in the United States and abroad, and in 1947 he became chief executive of the Telephone Operating Division, with executive supervision over the operations of both the domestic operating companies, and the affiliates division comprising a number of operating properties abroad. In the fall of last year he was transferred to the staff of Major General James A. Code, Jr., chief executive of the Gary Group, continuing in that assignment until his recent appointment as staff representative for Automatic Electric.

Through his long association with the telephone companies of the Gary Group, involving the administration of both large and small companies operating over a wide area, Mr. Williams has had the benefit of unusually broad experience in this field, and is widely recognized throughout the industry for his keen understanding of the manifold problems being faced by operating companies under today's conditions. It is expected that his background in the industry and particularly his long experience in such matters as those relating to accounting, finance, and rate structures, will prove of great mutual benefit to Automatic Electric and its telephone company customers in the Independent field.

Ohio Associated Plans $2 Million Project

The Ohio Associated Telephone Co. has announced a $2,000,000 program to improve service in the Brookville, Ohio, district, which covers portions of Preble County, Ohio, and Union City, Ind.

D. D. Humes, Brookville, Ohio, district manager, said 16 towns in the district will benefit under the program. These include Gratis, Lewisburg, Oxford, Verona, West Alexandria, Morning Sun, College Corner and Liberty.

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You're sure of deliveries on schedule when you order poles and crossarms from Graybar.

We supply full-length, pressure-treated poles and Douglas fir crossarms. The high, rigid standards these materials have to meet are your assurance of outstanding strength, endurance, and uniformity — adding up to long service.

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The insulators, wire, strand, hardware, and tools that Graybar distributes are all made by leading manufacturers.

Whenever you order telephone supplies from Graybar, you not only get first-quality items — you get delivery from a near-by Graybar warehouse, saving valuable time in either emergency or regularly scheduled shipments.

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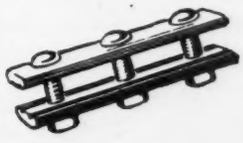


Everything in Telephone Supplies Via Graybar

IN OVER 100 PRINCIPAL CITIES

Iowa Convention drew record crowd of 600.

Earle Bellamy Heads Iowa Association

EARLE G. BELLAMY of Knoxville was elected president of the Iowa Independent Telephone Association during the group's annual convention at Hotel Fort Des Moines. He succeeds Clyde McFarlin of Montezuma.

Other officers named were C. C. Pearce, Riceville, first vice-president; Roy Brandel, Mount Pleasant, second vice-president, and W. F. Miller, Des Moines, secretary-treasurer.

Directors, with the officers, include Howard C. Amick, Des Moines; E. G. Carlson, Creston; Toral Duckett, Sioux Falls, S. D.; C. A. Farrington, Centerville; W. H. Fowler, Pella; Frank Gordon, Fort Dodge; E. L. Hons, Paullina; H. J. Hopkins, Jesup.

A. L. Kelley, Clarinda; McFarlin; H. B. Melick, West Liberty; Lester D. Meyers, Logan; Don Mong, Newton; L. F. Morrison, Grinnell; Wilburu Naylor, Kansas City, Kan.; Ross Vernon, Sioux Center; E. B. Zerwas, Manning, and Sutherland Dows, Cedar Rapids.

The group demanded abolishment of the "tremendously unfair, illogical, discriminatory and ruinous excise tax" on telephone service in a resolution passed at the closing session.

It said "the classification of telephone service as a luxury" is both ridiculous and an insult to the intelligence of the American people.

In a second resolution, the association suggested that terms of rural electrification administration (REA) loans requiring payment of 3 per cent annually on principal would make it impossible for many companies to meet the loan, operating costs, taxes, etc., out of present income.

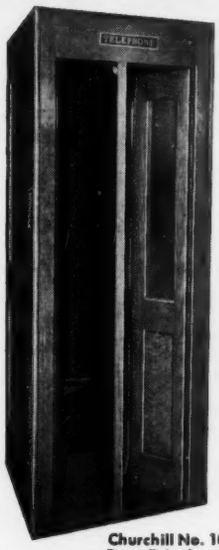
The resolution also asked the REA to give "honest preference" in making loans to companies now serving an area, "over new companies organized to get into the telephone business with government capital and to compete with existing companies."

The association in the same resolution pledged co-operation with the new REA telephone division, and also "to make a united defense against any and all attempts to undermine public confidence in existing telephone companies or to destroy their investments."

Speakers at the convention included: Mr. McFarlin; Colonel Wm. C. Henry, Bellevue, Ohio, chairman of the U. S. Independent Telephone Association's Committee on Problems of Small Companies; Willard A. Jones, REA Loan Appraiser, Washington, D. C.; Stuart H. Kelley,

(Please turn to page 70)

STROMB



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With no moving parts, the Raytheon Rectifilter requires neither adjustment nor maintenance. It will outlast many sets of batteries, release wires carrying charging current from central office to subscribers' PBX boards for revenue producing service, and minimize power cost because of high efficiency in converting from AC to DC.

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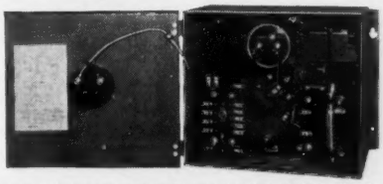

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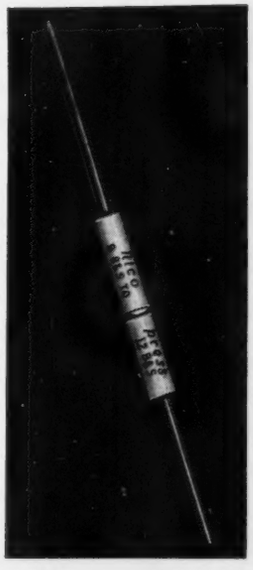
Making a splice with *Nicopress* is a simple matter. Just clean the conductors, slip them in the reducing sleeve, compress the sleeve with the *Nicopress* Tool, and the job is done.

For splices of all kinds, easy to make—hard to break—specify *Nicopress.*



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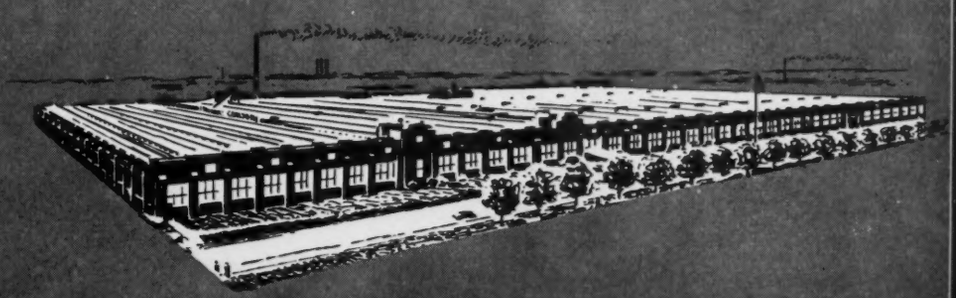

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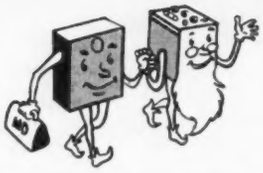

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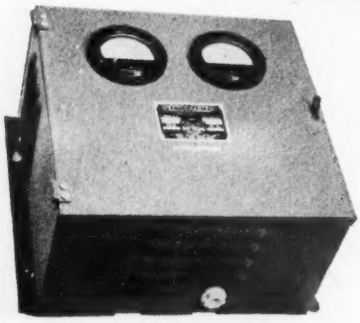

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traffic operations supervisor, Northwestern Bell Telephone Co., Omaha, Neb.; Don Ross, merchandising manager, Successful Farming, Des Moines, and Mrs. Mayme Workman, Springfield, Ill.

C. C. Pearce, Riceville, presided at the panel discussion on matters of current interest. Panel members were: George Charlesworth, Des Moines; Claude Coykendall, Des Moines; H. B. Couch, secretary, Kansas Telephone Association, Topeka; Kenneth L. Dally, Sioux Falls, S. D., Margaret Grace, Ft. Dodge, Carleton Hoven, Rockwell City.

President McFarlin pointed out in his address that in many respects, the past year has been the most momentous in the history of the telephone industry.

"Certainly," he said, "in no period have we been met with such important legislative problems, or more rapid moving developments. On the National scene the year was ushered in by the introduction of a new Minimum Wage and Hour Law that provided for a very heavy financial impact upon our industry, and there followed shortly the introduction of Rural Telephone Legislation, which Legislation, in its original form, would have provided for the liquidation of a great segment of the Independent Telephone Industry. . . .

"To add to our difficulties, many companies are still confronted with a heavy load of held orders, demands for extension of service and new equipment beyond the capacity of the industry to physically construct or finance on a basis that would enable the industry to receive a fair return."

Discussing rural telephone legislation, Mr. McFarlin stated, "For the past several years there has been considerable agitation, a great deal of it politically inspired, some of it grass roots activity, demanding that some governmental action be taken to extend and improve rural telephone service."

"Great stress," he said, "was laid on statistics purporting to show that less than 50% of the farmers in the United States had telephone service. Our industry have reason to doubt the correctness of such statistics, particularly when we applied the yard stick of our own experience in Iowa.

"The supporters of government action had no experience in telephone matters and their arguments were based on many false promises, the most important of which was that every farmer wanted, and was willing to pay, for telephone service. Our experience in Iowa, which has the

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Size 4" x 4½ x 10" Weight: 8 Pounds

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FARGO, NORTH DAKOTA

largest rural development of any State in the Union, shows that there are many farm homes past whose doors a telephone line has been in existence for many years, who do not have, nor do they desire, telephone service. While accurate statistics are not available, it is the best judgment of those who are charged with the administration of the affairs of the Association that 90% of the rural farm homes in Iowa have telephone service, and that practically all the remaining 10% could have telephone service should they desire it and be willing to pay an adequate rate for such service. It is true that many of the farm homes without telephone service would take it if they could have service in some neighboring telephone exchange instead of one whose lines goes past the farmers door. We further know it is not practical, nor economical, for exchanges to invade each others territory, and exchange limits must be observed."

Mr. McFarlin explained that at the last meeting of the Iowa Association, a Resolution was adopted by unanimous vote stating "we felt Government aid was not required, to extend rural service, and that the industry was ready, willing and able to do the job, if given a reasonable time to do the job."

"There was," he said, "pending, at that time, certain bills in Congress which we believed had the design of taking rural business away from existing telephone companies and putting it in the hands of new companies to be organized by government sponsorship, financed by government funds, and operated by companies that, for all practical purposes, were branches of the Government.

"In the hearings held before the House Committee, representatives of existing industry met a most hostile and not too courteous reception and the Bill reported to the House, and passed by the House, certainly had most threatening aspects.

"In the hearings before the Senate Committee on Agriculture and Forestry, to which was referred various bills, on the subject, we met a different reception. Your President appeared in behalf of the Iowa Association, and suggested to the Committee that such Legislation was not needed, that it was not in the public interest, especially in view of the condition of the budget of the country, and that industry would do the job if given an opportunity. Other very effective presentations were made in behalf of the Independent Telephone Industry, and as a result of these appearances, we believe, a fairly satisfactory Bill was reported by the Senate Committee.

"While this Legislation commits the Government to make loans for the purpose of extending and improving rural telephone service, certain safe guards for existing companies were written into the law. Briefly, preference was given to existing companies for one year; a rural area was defined to be one in which there was not included a city, village or town having a population not in excess of 1500 inhabitants. There was a further provision made that no loans might be made in states having Regulatory bodies, unless a certificate of convenience and necessity was granted by the Regulatory Body. Unfortunately, less than one-third of our states have such a provision and many states have a provision that the REA is not subject to the jurisdiction of the Regulatory Body. Nor should those of us who are operating in communities having more than 1500 in population, take too much satisfaction from this provision because if the Administrator determines that such facilities are necessary to

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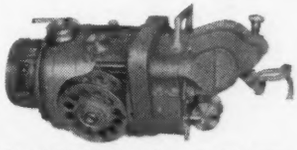
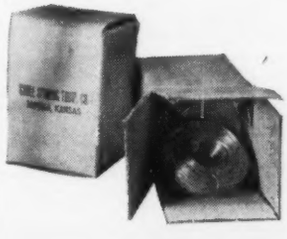
You can **see** the difference! Records of independent telephone companies from coast to coast ***prove*** the difference—spun cable protects your plant investments . . . reduces maintenance costs as much as ⅔!

That's why more and more telephone companies everywhere are specifying spun cable for new construction and line maintenance.



Cut Maintenance time, speed new lines—equip your crews with Neale Model D Cable Spinner.



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Cable spinning is fast, economical, practical when your crews are equipped with Cable Spinning Equipment Company tools designed especially for the job. There's a complete line to choose from.

For BEST RESULTS use NEALE WIRE!
Available in 7 different types, Neale Spinning Wire meets the toughest construction and corrosion problems.

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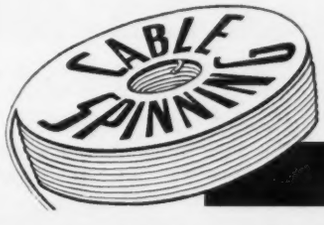

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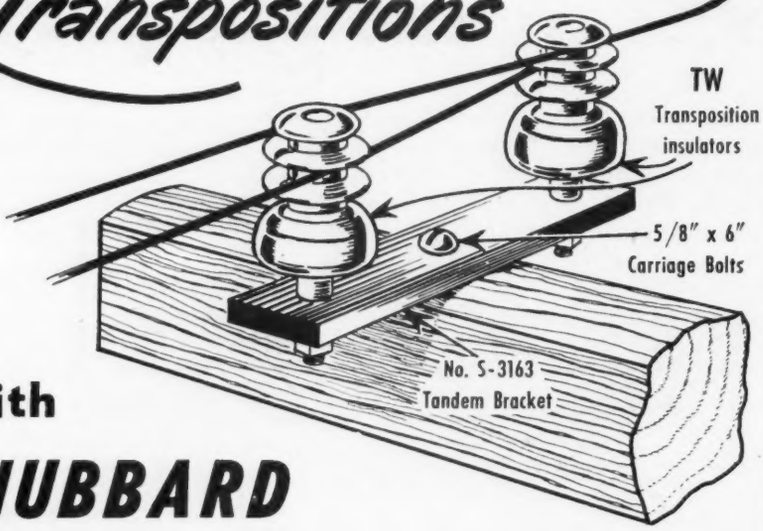

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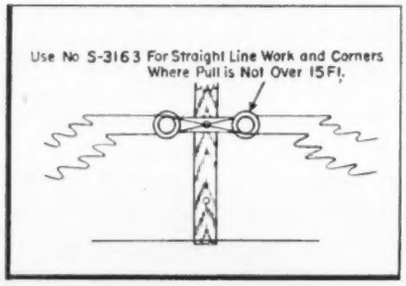
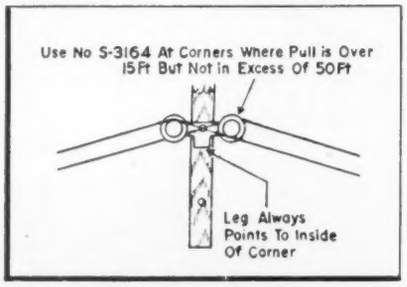
For efficient rural line transpositions where time and material costs have to be figured closely, specify Hubbard Tandem Transposition Brackets. Packed 100 to a carton.





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provide for adequate telephone service outside the boundaries of said area, then he may make a loan to a company to secure such facilities, even though it invades a municipality having over 1500 inhabitants. . . ."

Commenting that there has been some apprehension in the telephone industry because of the delay in making loans to existing telephone companies, Mr. McFarlin stated—"A feeling has grown up that these loans were being purposely delayed by the Administrator until the year's preference period had passed, and then that loans would be made to new companies organized to compete with existing companies. In fairness to Mr. Wickard, and his Associates, I should like to say I believe they are making a good faith effort to comply with the preference provisions of the Act. It is not the present plan of Mr. Wickard to use the REA organization for the purpose of sponsoring new companies to compete with existing telephone companies. I further believe Mr. Wickard will continue to process applications for loans received before the end of the preference year, in the order in which they are received, and not to receive applications for loans for competing companies until after all existing applications have been processed.

"If, at any time, we find that contrary course of conduct is undertaken, it is the duty of our industry to vigorously defend its members, because no one knows when his turn may come next.

"The rural telephone law has become a part of our National Law. While we felt, and perhaps still feel, that Legislation was unnecessary, it is now our duty to cooperate with the Administrator in his efforts, and to assist the members of our Association who desire to take advantage of the Law. On the other hand, we have the right to expect that the Administrator will comply in good faith with the preference provisions of the Act, and even after the preference period expires that the Administrator should not concern himself with the assisting and organizing of new companies to compete with existing companies, who are ready, willing and able to extend and improve rural telephone service."

Rural Issues Discussed At Kentucky Meeting

ENTRANCE of the Federal Government into the field of rural telephone financing, was the principal program subject at the 1950 meeting of the Kentucky Independent Tele-

(*Please turn to page 74*)

Since the telephone was "a toy"...

BACK IN 1881, when this curious old switchboard was in use, many people thought of the telephone as little more than a toy. Apparatus was crude and service was limited—but even then the telephone was proving its worth.

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phone Association at Lexington, Ky. The one-day meeting was held at the Phoenix Hotel. L. O. Evenson, manager of the Lexington Telephone Company and president of the association, presided at the three sessions.

Earle Blomeyer, vice president of the Southern Continental Tel. Co., was elected president of the association succeeding Mr. Evenson. Other officers chosen at the meeting were Louis Cox, attorney, Frankfort, vice president; G. B. Foscue, Jr., Consolidated Tel. Co., Florence, vice president; M. V. Shepherd, Ashland Home Tel. Co., Ashland, vice president; R. P. Sullivan, Lexington Tel. Co., secretary-treasurer. Directors are, in addition to the above named officers, Mr. Evenson; D. H. Lloyd, Lexington Tel. Co.; W. R. Bacon, Southern Continental Tel. Co., Glasgow; H. S. Poage, Northeastern Tel. Co., Augusta.

Two speakers, D. B. Corman, R.E.A. consultant, Washington, D. C., and E. B. Emrey, president of the Harlem Tel. Co., Harlem, Ga., and retired Georgia manager for Southern Bell, encouraged the Kentucky Independents to apply for R.E.A. loans to extend rural telephone service in their areas. Both speakers pointed out that, even though a company might be hesitant to ask for such a loan in view of the possible requirements, an application for a loan would in no way obligate the company and that, in considering the application, the R.E.A. would no doubt clarify these requirements to such a point that the company would have definite information upon which to base its final decision.

Mr. Emrey pointed out that a company in making such an application would prevent a cooperative from forming to serve its area until the company could determine whether it wished to make an R.E.A. loan or not.

"Judge" Emrey, in discussing "A Small Company's Viewpoint of the R.E.A. Telephone Bill", stated that there never was a time in the telephone business when coordination of thought and action was needed more than now, when the activities of the various associations was more important to its members and that never had there been such a challenge or threat to those providing telephone service, particularly the small companies.

"Perhaps we haven't done the job of extending rural telephone service as well as we should have done it," Mr. Emrey said, "but the companies just couldn't afford to give complete coverage in sparsely settled areas. The companies are cognizant of their

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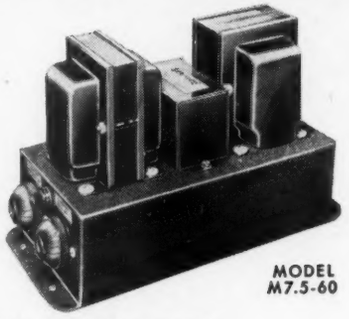
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BC-20X	3½ W.	P. B. X.
M-7.5	7½ W.	Small Swbd.
S-60	20 W.	Standard
BX-60	15W.	Standard
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For Details See Bulletins 155 and 159

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The Biased Core, SELF-STARTING SUB-CYCLE Will Be Available After March 1950. Arranged for Either 19" or 23" Relay Rack Mounting.

BC-20M	7.5W.	Small Swbd.
BC-20S	20W.	Standard
BC-20C	45 W.	Heavy Duty

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responsibilities, but good business sense dictates that a company can't take on more than it can profitably afford."

The R.E.A. administrator, he said, has well recognized the hazards of providing rural telephone service in making rules for loans to existing telephone companies. These hazards are the same that have prevented private capital from extending telephone service to the sparsely settled areas in the past and are the same hazards that may prevent the companies from mortgaging their good property to make R.E.A. loans.

On the other hand, he pointed out, cooperatives will come in without much experience and under present rulings are being asked for practically no loan protection other than a mortgage on the plant constructed with the loan. This, he stated, makes it look as though the R.E.A. administration is unwilling to let private capital do the job.

Mr. Corman spoke on "what an R.E.A. loan may do to help you provide more extensive telephone service to your community". Some people, he said, visualize the R.E.A. program as an octopus rising from the tide waters of the Potomac to absorb the independent companies. This, the R.E.A. consultant insisted, was not the case, that the R.E.A. rural telephone legislation was designed merely to make possible telephone service for those in rural areas who want it. The long-range objective of the program is a phone on every farm.

He said that it was up to the independents to do a big part of this job, that independents served 11,000 cities and towns in the United States.

Two per cent loans with 35 years to repay should enable the independents to do the job in their areas, he said. In addition to the most reasonable loan terms, the R.E.A. offered its advisory services free in helping the companies extend their rural coverage.

Borrowers, he pointed out, must provide a certain amount of equity. This would be greater than in the case of loans to extend power lines because the extension of rural telephone lines involved greater risks. Electric loans, he said, are backed by the users' investment in refrigerators, stoves, radios and other appliances. With the telephone user this is not the case.

All the R.E.A. asks is that you provide good telephone service for all who want it and repay the loan. The size of the loan or the company is not important. Each loan application will be treated entirely on its own merit.

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Type 60A **cable terminals**

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Use these durable Type 60A Automatic Electric Cable Terminals for connecting sub-station drops or open wire lines to lead-covered cables. Constructed of heavy glazed porcelain with terminals and hardware of high grade copper-silicon alloy. Terminals are reversible so that cables can be run from the top or bottom and mount easily on poles or buildings. The heavy, sheet metal cover (not shown) is chained to the housing of the terminal and contains chart for recording connections.

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Made entirely of non-breakable Malleable iron. 5x5 illustrated above. Also in 4½x13, and 6x17 sizes.

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Mr. Corman justified the Government's entrance into the field of telephone financing by saying that "democratic government must meet with the economic and social needs of its people—otherwise they will turn to another form of government promising to fill these needs."

So far 277 applications and 1300 inquiries had been received by the R.E.A. concerning telephone loans. Seven applications had been received from Kentucky of which five were from existing companies, two from cooperatives.

Mr. Corman then answered questions from the audience regarding applications and loans and the program in general.

Earle Blomeyer, who was elected new president of the association at the meeting, discussed the bill that had just passed the Kentucky Senate and was then before the Kentucky House to enable the making of R.E.A. loans in Kentucky. He said that representatives of the association and Southern Bell had presented amendments to the original bill at Senate hearings, that a number of them had been agreed upon by both sides and that the final bill had been made much more agreeable to the companies. Mr. Blomeyer was high in his praise of testimony made concerning the bill by Fred J. Turner, vice president of Southern Bell. He felt as though the committee had been reasonably successful in having modifications made to the bill.

A letter from C. J. Yates, Southern Bell Kentucky manager, was read to the group. Mr. Yates expressed his regrets at being unable to attend the meeting, stated that he was vitally interested in the extension of service in rural areas and offered the assistance of Southern Bell to the other companies in getting the job done in their sections.

Mr. Evenson, in his president's report, stated that the past year had been a big one for the association, that it had considerable activity involving the interests of its members, principally as concerns the Federal and State rural telephone bills, the minimum wage bill and the efforts to remove or reduce excise taxes on telephone service.

R. C. Reno, editor of *Telephony*, Chicago, Ill., spoke at the morning session on "Preserving Our Freedom Is a Full Time Job."

Preserving freedom, he stated, "is by far more vital to all of us as individual citizens and as telephone people than any or all of industry's problems facing us today." He warned against "those who would supplant our democratic form of government

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and free enterprise system with a socialistic state, under which an all powerful contralized government would control and regiment not only our business and industrial activity but the very freedom and liberty upon which our everyday life and happiness depend."

The meeting came to a close on a lighter key at the annual banquet. An orchestra and a quartet provided music. R. W. Wilson of the Kentucky Utilities Company delivered a humorous lecture, extolling the virtues of Kentucky, its land, its people and its history.

Stromberg-Carlson Moves San Francisco Office

Stromberg-Carlson officials have announced that the company's San Francisco office and warehouse have been moved from 325 Ninth Street to more conveniently located quarters at 1339 Mission Street, San Francisco 3, Calif. Telephone numbers remain unchanged.

Joseph P. Galligan, manager of Pacific coast telephone sales for Stromberg-Carlson, is in charge.

Underwriters' Lab Lists Davis "Vapotester"

Listing of the Davis "Vapotester" by the Underwriters' Laboratories has been announced by Frank Davis, Jr., vice president of the Davis Emergency Equipment Co., Inc., Newark, N. J.

The "Vapotester," also approved by the Laboratories of the Associated Factory Mutual Fire Insurance Companies, is a Davis engineered instrument for the detection of combustible gases and vapors.

Operating on the principle of the Wheatstone Bridge Circuit, the "Vapotester" reads zero gas or vapor to the lower explosive limit. It is widely used in refineries, chemical plants, natural or manufactured gas plants, gas or oil pumping stations and transmission lines, etc. for the determination of hazardous gas and/or vapor conditions, and the source of leaks. The Davis Company will send full technical data on request.

P. Wall Co. Introduces New Blow Torch Design

M. A. Silverman, vice-president in charge of sales for the P. Wall Manufacturing Co., Grove City, Pa., has announced that the factory has swung into production on their new "*Pistogrip*" blow torch.

This new "*Pistogrip*" torch design

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New "Pisto-Grip" Blow Torch.

has an easy-to-grip indented handle of light-weight composition plastic so easy to hold that it makes other torches obsolete. Mr. Silverman stated that P. Wall's "*Pistogrip*" is the first radical change in blow torch design in 30 years and that it is available for immediate delivery in all popular-priced models at no extra cost.

According to Mr. Silverman the convenient new "*Pistogrip*" blow torch automatically means increased ease of handling and less fatigue for blow torch users everywhere. Continually improving products and product merchandising is the aim of the P. Wall Mfg. Co. This spring, more than ever, will find pacesetting P. Wall products backed by a fully coordinated, resultful campaign of advertising, sales promotion and dealer helps.

Gould's Chicago Office Moves To Larger Quarters

To offer expanded sales engineering facilities to Midwestern purchasers of industrial batteries, the Chicago Regional Offices of the Gould Storage Battery Corporation moved, May 1, 1950, to larger quarters. The move, from 175 West Jackson Boulevard to 100 East Ohio Street, is in line with the increasing activity in the battery industry due to growing numbers of battery applications in the materials handling, railroad, mining, and stand-by-battery fields.

The Chicago Office, headquarters for sales representatives and field engineers servicing industrial battery users from the Rocky Mountains to Ohio, is headed by R. C. Cragg, Midwest regional manager.

Copperweld's Export Business Booming

Copperweld Steel Company's Wire & Cable Division, Glassport, Pennsylvania has just received an order for 517,000 pounds of Copperweld wire from Italy for extensions and improvements of that country's long distance telephone system.

During the last year Copperweld wire has been used extensively in the post-war rebuilding of Italy's telephone and telegraph systems with more than 3,000,000 pounds of Copperweld's telephone line wire having been supplied for that purpose.

Copperweld also has just received an order for 75 miles of its ½" Copperweld 7-wire strand for the overhead ground wire to protect the Strait of Messina 220 KV transmission line in Italy.

Copperweld's wholly owned subsidiary, Copperweld Steel International Company, is playing an important part in the extension of electric power and telecommunication systems in many countries.

Large quantities of Copperweld wire and cable have been used during the past year in the construction of power and communication lines in the Union of South Africa, Rhodesia, Argentina, Brazil, Venezuela, Mexico and Canada.

According to William J. McIlvane, Executive Vice President in Charge of Copperweld's Wire and Cable Division, other foreign engineering projects now in progress will result in a large volume of orders for Copperweld's wire and cable products from these and other countries during the next year.

Electric Products Company Appoints Cincinnati Agents

The Electric Products Co., Cleveland, Ohio has appointed Sheldon Storer & Associates as District Representatives for the south-western section of Ohio and the State of Kentucky.

With offices in Cincinnati, Ohio, Sheldon Storer & Associates will be responsible for promoting The Electric Products Co. line of Synchronous and Induction Motors, A-C and D-C Motors and Generators, Battery Chargers, Electrolytic Power Supplies and Frequency Changers.

James W. Whitesel Joins Stromberg-Carlson

Theodore L. Bowes, Stromberg-Carlson patent attorney, has announced the appointment of James W. Whitesel of Washington, D. C., World War II veteran, to the company's patent division.

Mr. Whitesel, a graduate of Wake Forest and George Washington universities, will be assigned to work on patents dealing with Stromberg-Carlson's telephone instrument and telephone switchboard equipment.

Morrison Steel Products Announces Expansion Plan

In order to meet the needs of their constantly expanding business and the development of their new products, Morrison Steel Products, Inc., Buffalo, N. Y., has broken ground for the addition of a new building and realigned the functions of its executives, Jacob Morrison, chairman of the board, announced recently.

Founded in 1912, Morrison Steel Products, Inc., has been a pioneer in the steel stamping industry, primarily in contract work for the truck industry—including White, Mack, Brockway and International Harvester.

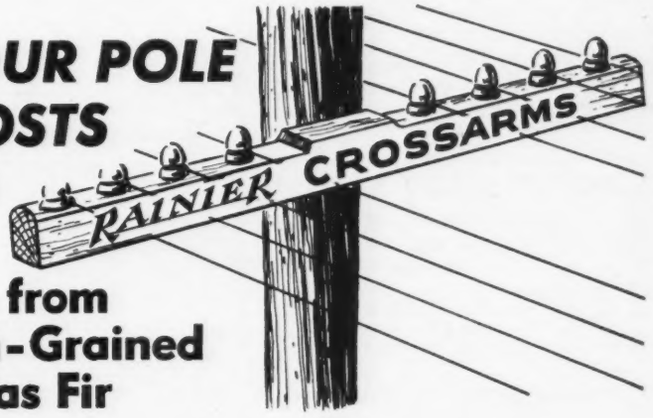
In 1945 the company entered the domestic forced warm air furnace field with their line of "Mor-Sun" pressed steel furnaces. In these five years, they have become one of the leaders in this industry, with distribution in every state of the Union. Gene Brown is sales manager of this division.

Two years ago Morrison Steel added a line of service and utility truck bodies—known as "Carry All" bodies—which are nationally advertised and nationally distributed. Larry Brennan was recently appointed sales manager of this division.

Isadore Morrison, vice president, assumes complete charge of manufacture of all products; Arthur J. Harsch, vice president, retains supervision of engineering and assumes the duties of sales engineer and new product development. M. Jacque Kohnstamm, vice president and director of purchases, becomes assistant to the president in carrying out executive policies. Claude O. Rainey is secretary-treasurer.

The addition of the new 30,000 square-foot building on its 12½-acre land at 601 Amherst St., will handle the increased volume of warehousing and shipping necessary, and will be under the supervision of Charles D. Natal, traffic manager and supervisor of shipping and receiving.

CUT YOUR POLE LINE COSTS with



Made from Tough-Grained Douglas Fir

Only Douglas fir can resist the extremes of pole-line weather conditions—and only the best of this tough-grained wood goes into the making of Rainier Crossarms. Rainier Crossarms are milled from selected specimens, processed by scientific kiln drying and controlled air seasoning. Cut your pole-line costs with Rainier Crossarms made by American Crossarm & Conduit Company.

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Specialists in
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CLASSIFIED ADVERTISMENTS

Help Wanted

HELP WANTED: Man capable of rebuilding magneto and PBX switchboards. Telephone Repair & Supply Co., 1760 N. Lunt Ave., Chicago 26, Illinois.

HELP WANTED: Man experienced in selling to telephone companies to travel in the midwest representing telephone equipment supplier. Salary and profit incentive. Write giving age, experience and when can be available. Replies will be kept confidential. Write Box No. 8671 c/o Telephone Engineer.

COMMUNICATION ENGINEER Large engineering firm in New York desires communication engineer with 8 to 10 years' experience in design engineering, economic studies, preparation of specifications and technical reports, also should be familiar with telephone equipment and apparatus. Please submit complete resume to Box No. 8672 c/o Telephone Engineer.

For Sale

FOR SALE: Kellogg desk stands with Kellogg bell enclosed, metal ringer boxes. Complete Common Battery sets $3.00 each. Excellent condition. Parma Telephone Co., Parma, Idaho.

FOR SALE: Small Magneto Exchange-New Mexico. House, lot, and tools. Gross $7100.00. Priced for quick sale. Excellent expansion possibilities. T. J. Anders, Chama, New Mexico.

FOR SALE: Available shortly after July 1, 1950, Kellogg Masterbuilt Switchboard two position. In excellent condition—only 2½ years old. Each position has 15 cord circuits, wired and equipped the two positions 400 common battery wired for 80 Magneto and equipped with 20 also has two party divided manual ringing. Hot Springs Tel. Co., Box 592, Truth or Consequences, N. M.

For Sale

FOR SALE—Telegraph Repeater Equipment, Single Line, One-way Polar and Polar Duplex. Available after July, 1950. Inquire—The Lincoln Telephone and Telegraph Co., Lincoln, Nebraska.

FOR SALE: Magneto wall sets, compact type with rebuilt transmitter and receiver. Serviceable condition and tested before shipment. A bargain at $10.00, F.O.B. Chicago. Write or call Clark-Jarvis Telephone Equipment Co., 7367-69 North Clark Street, Chicago 26, Ill.

FOR SALE: 320 Line Western Electric P.B.X. Switchboard Type 551B Equipped with 200 lines, 6 trunks, 10 cord circuits. $650.00. Excellent condition. Hot Springs Tel. Co., Box 592, Truth or Consequences, N. M.

FOR SALE: Switchboard—Stromberg-Carlson No. 106 switchboard, wired 200 common battery lines, equipped 80 common battery lines, wired and equipped 20 magneto lines, wired and equipped 10 cord circuits. Very suitable for two or three hundred station exchange. Price $780.00 f.o.b. Citizens Telephone Co., Decatur, Indiana.

FOR SALE: 100-station magneto exchange in Kingsdown, Kansas. Good toll income. Sacrifice at $1000. Write Frances L. Wideman, Box 67, Ford, Kansas.

FOR SALE: P. B. X.—Stromberg-Carlson No. 102 P. B. X. wired 100 lines, equipped 70 lines, wired and equipped 10 cord circuits, equipped 1 conference circuit, wired 10 cord-ended trunks, equipped 8 cord-ended trunks. Price $410.00 f.o.b. Citizens Telephone Co., Decatur, Indiana.

For Sale

FOR SALE: Magneto telephones—400 Stromberg-Carlson No. 896 wall type, 4 and 5 bar generators, very good condition telephones. Inquire Citizens Telephone Company, Decatur, Indiana.

FOR SALE: Two complete Stromberg-Carlson Magneto switchboards, recently out of service. One 100, one 50 lines, 15 cord pair each for $200.00. One Electrox Rectifier for operator's $15.00, one Model S Sub-cycle, $40.00, 200 Magneto telephones, $2.50 each. Orting Telephone Exchange, Orting, Washington.

FOR SALE: P.B.X.—Stromberg-Carlson No. 121 cordless P.B.X. 3 trunks, 16 lines, 5 connectors. Price $380.00 f.o.b. Citizens Telephone Co., Decatur, Indiana.

FOR SALE: 84 station exchange in eastern Washington. Good rates and wonderful toll business. Priced at less than two years income. All telephones in town new S.C. handsets in '48. Most lines in town on new poles and wire. Office in resident. Ideal for man and wife. Write Jim Taylor, Creston, Washington.

FOR SALE: Switchboard—Stromberg-Carlson No. 106 switchboard. Wired 200 common battery lines, equipped 60 common battery lines, wired 10 magneto lines, equipped 3 magneto lines. Wired and equipped 10 cord circuits. Suitable for two or three hundred station exchange. Price $710.00 f.o.b. Citizens Telephone Co., Decatur, Indiana.

FOR SALE: P. B. X.—Stromberg-Carlson No. 104C cordless P. B. X. 3 trunks, 10 lines, 5 connectors. Price $125.00 f.o.b. Citizens Telephone Co., Decatur, Indiana.

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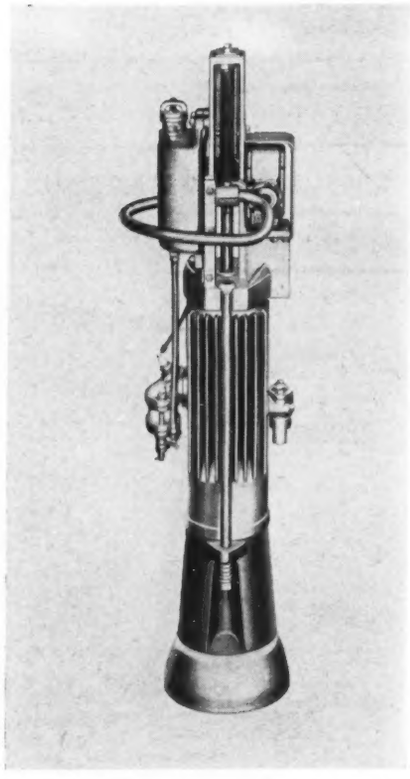
ADDITIONAL Information on New Products or Service and Supplies of any Advertiser listed in this section may be promptly obtained by filling out the handy request for more information reproduced on the opposite page. All items are numbered. Check number of items on which more information is desired and send to Telephone Engineer Publications. Kindly mention Telephone Engineer Publications when contacting advertiser direct.

the New Products Showcase

New Products & Supplies of Practical Interest



New earth fill tamper is designed to produce high degree compaction in restricted areas combining efficiency, speed and ease of operation with extremely low cost. Completely self-contained and portable; it eliminates ganging of individual tampers into cumbersome units; it needs no expensive auxiliary equipment, no supply lines to hamper normal job movement and the placing of fill material. The extremely high penetration of the unit insures specified compaction on lifts of 12" to 20".

The unit may be used on sand or granular soils with complete efficiency. It can tamp about 10 to 24 cubic yards of soil per hour. Actual job reports show that it can be operated over 20 hours per day over weeks of intensive construction work, without suffering from heat or vibration problems common to conventional combustion equipment. The unit is self-contained with the ignition supplied by a magneto. It operates on a modification of the rocket principle, jumping upwards from the thrust of the power cylinder against the "foot" and dropping by its own weight. The gasoline tank holds about two quarts of fuel, which is a mixture of ½ pint of SAE 30 or SAE 40 oil to one gallon of gasoline. — Check New Product 234.

ACETYLENE EQUIPMENT — "Prest-O-Lite" No. 1 Lineman's outfit helps you do a better job, quicker & easier. The Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y. —[ADV 1]

ADVERTISING, Directories—General Telephone Directory Co., 604 Pine Ave., Long Beach, Cal., and 185 N. Wabash, Chicago, Ill.—[ADV. 2]

ANCHORS, Plastic Expanding, Universal. All Purpose—Mount in any Material, Holub Industries, Inc., 424 DeKalb Ave., Sycamore, Ill.—[ADV. 3]

ANCHORS & WIRE CONNECTORS—Matthews Scrulix Anchors, Matthews Telephone Wire Connectors. Write for bulletins. W. N. Matthews Corp., St. Louis 16, Mo.—[ADV. 4]

AUGER—The "Alaska Frost Auger." Free trial on your own machines. Henning Electric Motor Co., P. O. Box 786, Fargo, N. D.—[ADV. 5]

BATTERIES, Dry Cell—The Ray-O-Vac Company, 2317 Winnebago St., Madison, Wisc.—[ADV. 6]

BATTERY—WATER UNITS Demineralizers For Tap Water—A. E. Tomkin & Co., 1828 Columbia Rd., N.W., Washington 9, D. C.—[ADV. 7]

BELTS — CLIMBERS — COMPLETE LINEMEN'S EQUIPMENT, W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.—[ADV. 8]

BLOCKS, AERIAL CABLE—"Tug-O-Wheel" aerial cable blocks for safe and speedy installation of all types of aerial cable. Tug-O-Wheel Products Co., Ballston Spa, N. Y.—[ADV. 9]

BOOTHS—Acoustic Telephone—Sherron Metallic Corp., 1201 Flushing Ave., Brooklyn 6, N. Y.—[ADV. 10]

BOOTHS—Churchill Cabinet Co., 2119 Churchill St., Chicago 47, Ill.—[ADV. 11]

CABLE, All Plastic, Aerial, Duct, Direct Burial, PBX, Switchboard.—The Ansonia Electrical Co., Ansonia, Conn.—[ADV. 12]

CABLE SPINNING—The Cable Spinning Equipment Company, 432 Crane St., Topeka, Kans.—[ADV. 13]

CARRIER EQUIPMENT—Adler Telephone & Telegraph Carrier Equipment has been standard for twenty years in the Independent Field. Mfd. only by Southern Electric & Transmission Co., 3127 Holmes St., Dallas, Texas.—[ADV. 14]

CONNECTORS, CABLE—Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Calif.—[ADV. 15]

CORDS, Instrument and Operators—Commercial Cord & Supply Co., 26 Main St., Clifton Springs, N. Y.—[ADV. 16]

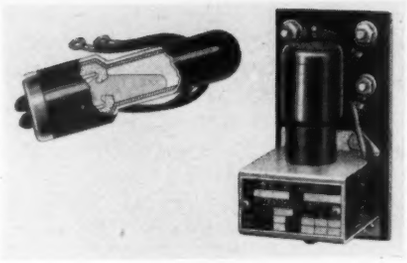
CORDS, Switchboard & Telephone—Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.—[ADV. 17]

CROSS ARMS—American Cross-Arm, Inc., 141 W. Jackson Boulevard, Chicago, Ill.—[ADV. 18]

DERRICKS—Set more poles with aluminum derricks. Aluminum Co. of America, 1407C Gulf Bldg., Pittsburgh 19, Pa.—[ADV. 19]

"EARTH BORING MACHINES" Sterling Model "A"—Precision Engineered and Hydraulic Controlled. Sterling Engineering & Mfg. Co., 173 Gilligan St., Wilkes-Barre, Pa.—[ADV. 20]

ELECTRIC HOT WATER HEATERS, Thermostatically controlled for any hot water heater, Vulcan Electric Co., Danvers 17, Mass.—[ADV. 21]



Durakool, Inc., Elkhart, Ind. has announced three new technical advances in the manufacture of its metal-clad mercury switches and timer-relays. First of the three advances is the use of a highly refined "cleaner" mercury in the switches and relays. Durakool claims this "clean" mercury will do a great deal more work than the mercury formerly used.

Durakool uses triple-distilled mercury. This mercury is processed under controlled atmospheric conditions for a number of hours, then filtered, using a new filtering process. Durakool states that "This procedure oxidizes all the dissolved impurities in the mercury that can not be removed by triple distilling, permitting these oxides to float on top of the mercury and be totally removed by the special filtering process." The result, it is claimed, is to greatly increase the liveliness over triple-distilled or chemically clean mercury. Durakool claims this results in a marked increase in the life of the switches and timer-relays, as well as a noticeably lower ohms resistance.

Second of the improvements announced by Durakool is the use of a new "higher arc" ceramic. The third advance is the institution of a metal conditioning process which reduces resistance. This process is applied to all metal parts of their mercury-type switches and timer-relays.—Check New Product 235.

ENGINEERING, Construction—Neale Construction Company, 432 Crane St., Topeka, Kans.—[ADV. 22]

FLASH LIGHTS. Carpenter Mfg. Co., 222 Master-Light Bldg., Boston 45, Somerville, Mass.—[ADV. 23]

FLOOR DUCT—The Versatile Floor Duct. Ask your jobber or write, Winders & Geist, Inc., P.O. Box 633, Lincoln, Neb.—[ADV. 24]

GENERATORS—A. C. power anywhere with "Katolight" plants and generators. Kato Engineering Co., 131 Maxfield Ave., Mankato, Minn.—[ADV. 25]

FURNACES—For quickly and economically melting lead and paraffin—Mutual Liquid Gas Equipment Co., Inc., 8600 W. Imperial Highway, Los Angeles, Calif.—[ADV. 26]

GLOVES—The Saranac Buckskin Linemen's Gauntlet made especially for linemen. Write for information, Saranac Glove Co., Littleton, New Hampshire.—[ADV. 27]

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INSULATORS, Porcelain—Porcelain Products, Inc., Box 300, Findlay, Ohio.—[ADV. 28]

JACKS, for lifting Cable Reels, Pulling Poles and Maintenance Work. Duff-Norton Mfg. Co., 1710 Preble Ave., Pittsburgh 12, Pa.—[ADV. 31]

LANTERNS, WARNING—"Little Air Pilot," the general purpose warning light. Embury Manufacturing Co., 210 Allen St., Warsaw, N. Y.—[ADV. 29]

LIGHTWEIGHT PULLERS—Coffing Hoist Company, 800 Walters St., Danville 5, Ill.—[ADV. 30]

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PIPE PUSHERS—Giant Manufacturing Co., South 6th St., at 12th Ave., Council Bluffs, Iowa.—[ADV. 32]

PIPE PUSHERS—Greenlee Tool Co., 2136 12 St., Rockford, Ill.—[ADV. 33]

PINS & BRACKETS—Mfrs of all sizes of Locust Pins and Oak Brackets , The Locust Pin Co., Inc., Front Royal, Va.—[ADV. 34]

PLUGS for the Telephone Industry. Write for Cannon Electric Condensed Catalog. Cannon Electric Co., 3209 Humboldt St., Los Angeles 31, Calif.—[ADV. 35]

POLE HOLE DIGGERS—For derrick mounted trucks Tel-E-Lect Products, Inc., 9613 Minnetonka Blvd., Minneapolis 16, Minn.—[ADV. 36]

POLES—Cedar poles and Fir cross arms. R. G. Haley & Co., Inc., Spitzer Bldg., Toledo 4, Ohio.—[ADV. 37]

POLES, Contract Inspection & Preservative Ground Line Treatment—Osmose Wood Preserving Co., 1443 Bailey Ave., Buffalo 12, N. Y.—[ADV. 38]

POLES, Southern Yellow Pine—Colfax Lumber & Creosoting Co., Inc., P.O. Box 23, Pineville, La.—[ADV. 39]

POLES, Telephone. "It pays to buy quality" International Creosoting & Construction Company. Galveston—Beaumont—Texarkana.—[ADV. 40]

POLES, Creosoted Southern Yellow Pine and Douglas Fir. The Long-Bell Lumber Company, Wood Preserving Div., R. A. Long Bldg., Kansas City, Mo.—[ADV. 41]

POLES, Southern Yellow Pine—Taylor Colquitt Company, 290 E. Main St., Spartanburgh, S. C.—[ADV. 42]

POLES, Southern Yellow Pine—Texas Creosoting Co., Orange, Texas.—[ADV. 43]

POLES—Texas Best pressure-creosoted poles. Lone Star Creosoting Co., P. O. Box 9, Longview, Texas.—[ADV. 44]

POLES—Western Red Cedar, Western Larch, Lodgepole Pine. B. J. Carney & Co., Minneapolis 3, Minn. and Spokane 8, Wash.—[ADV. 45]

POLES & CROSS ARMS—Creosoted poles and crossarms. Conroe Creosoting Co., Conroe, Texas.—[ADV. 46]

POLE LINE HARDWARE—Manufactured and stocked on the Pacific Coast by KORTICK MANFACTURING COMPANY, 345 First St., San Francisco 5, Calif.—[ADV. 47]

POWER UNITS—Insure against Power Failure with a "U.S." Stand-by Unit. Write for information. United States Motors Corp., 558 Neb. St., Oshkosh, Wis.—[ADV. 48]

PROTECTIVE EQUIPMENT—Reliable Electric Company, 3145 Carroll Avenue, Chicago 12, Ill.—[ADV. 49]

GAS-TITE CABLE TERMINALS—Sub station protectors, main dist. frames; central office protectors; interior junction boxes; lightning arrestors.—Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.—[ADV. 50]

PRINTING—Telephone forms. Cullom & Ghertner Co., 600 21st Ave., Nashville 4, Tenn.—[ADV. 51]

RADIO—Two-way radio systems. Motorola, 4545 W. Augusta Blvd., Chicago 51, Ill.—[ADV. 52]

REBUILT TELEPHONE EQUIPMENT—USED EQUIPMENT BOUGHT AND SOLD—Independent Telephone Repair Co., 1432 W. 15th St., Chicago 8, Ill.—[ADV. 53]

REBUILT TELEPHONE & SWITCHBOARDS—Telephone Repair & Supply Company, 1760 Lunt Avenue, Chicago 2, Ill.—[ADV. 54]

SAFETY FOOTING—"Hydra-Lizer" gives safety footings for all conditions; adjust ladder to terrain. Anderson Products Co., P. O. Box 691, Tulare, Calif.—[ADV. 55]

SOLDERING IRONS, Electric—Vulcan Electric Company, Danvers 17, Mass.—[ADV. 56]

SUPPLIES—Use the Suttle Catalog of "Rural Telephone Supplies." Suttle Equipment Co., Lawrenceville, Ill.—[ADV. 57]

TELERING—Telephone ringing by frequency conversion. Voltage range for all purposes, central office and private branch exchanges. Telkor, Box 186, Elyria, Ohio.—[ADV. 58]

SWITCHBOARDS, TELEPHONES, ETC.—Automatic Electric Co., 1033 W. Van Buren St., Chicago, Ill.—[ADV. 59]

SWITCHBOARDS, TELEPHONES, Etc.—The North Electric Manufacturing Company, Galion, Ohio.—[ADV. 60]

TREE EXPERTS—Davey Tree Expert Co., Kent, Ohio.—[ADV. 61]

TREE TRIMMERS—Seymour Smith & Son, Inc., Oakville, Conn.—[ADV. 62]

TRUCK BODIES—Artisan Products, Inc., 3540 West 140th St., Cleveland 11, Ohio—[ADV. 63]

TRUCK BODIES—Highway Trailer Co., Edgerton, Wisc.—[ADV. 64]

TRUCK BODIES AND EQUIPMENT—McCabe Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo.—[ADV. 65]

TRUCKS—Heavy Duty Engineered To Save You Money"—International Harvester Co., Chicago, Ill.—[ADV. 66]

UNDERGROUND TOOLS, Specialties and equipment for conduit and cable construction work. B. S. Barnard Co., 128 Lafayette St., New York 13—[ADV. 67]

WIRE DROP & INSIDE—Jackets of neoprene, rubber or plastic. Lowell Insulated Wire Co., Lowell, Mass.—[ADV. 68]

WIRE, FIELD TELEPHONE—Sugarman Equipment Co., 420 E. 8th St., Los Angeles Calif.—[ADV. 69]

WIRE, Insulated—DATED DROP WIRE—Neoprene or Weatherproof—Alphaduct Wire & Cable Co., Milltown, N. J.—[ADV. 70]

WIRE, Insulated Drop and Bronze or Copperweld—Acorn Insulated Wire Co., Inc., 36 Freeman St., Pawtucket, R. I.—[ADV. 71]

WIRE, Insulated Drop, Genuine Ironite—Paragon Electric Co., Two Rivers, Wis.—[ADV. 72]

WIRE, Insulated Drop, HT Bronze, Paraprene or Braid Insulation—Paragon Electric Co., Two Rivers, Wisc.—[ADV. 73]

WIRE, TELEPHONE, for all inside and outside uses—The Whitney Blake Co., Box K, Hamden, New Haven, Conn.—[ADV. 74]

WIRE CUTTERS—H. K. Porter, Inc., 74 Foley, Somerville, Mass.—[ADV. 75]

WIRE REELS, Saves time and trouble in paying out wire. Send for literature, Hykon Mfg. Co., Alliance, Ohio.—[ADV. 76]

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NEW PRODUCTS

NP 234..... NP 235.....

SERVICES AND SUPPLIES

ADV. 1.....	ADV. 2.....	ADV. 3.....	ADV. 4.....	ADV. 5.....	ADV. 6.....
ADV. 7.....	ADV. 8.....	ADV. 9.....	ADV. 10.....	ADV. 11.....	ADV. 12.....
ADV. 13.....	ADV. 14.....	ADV. 15.....	ADV. 16.....	ADV. 17.....	ADV. 18.....
ADV. 19.....	ADV. 20.....	ADV. 21.....	ADV. 22.....	ADV. 23.....	ADV. 24.....
ADV. 25.....	ADV. 26.....	ADV. 27.....	ADV. 28.....	ADV. 29.....	ADV. 30.....
ADV. 31.....	ADV. 32.....	ADV. 33.....	ADV. 34.....	ADV. 35.....	ADV. 36.....
ADV. 37.....	ADV. 38.....	ADV. 39.....	ADV. 40.....	ADV. 41.....	ADV. 42.....
ADV. 43.....	ADV. 44.....	ADV. 45.....	ADV. 46.....	ADV. 47.....	ADV. 48.....
ADV. 49.....	ADV. 50.....	ADV. 51.....	ADV. 52.....	ADV. 53.....	ADV. 54.....
ADV. 55.....	ADV. 56.....	ADV. 57.....	ADV. 58.....	ADV. 59.....	ADV. 60.....
ADV. 61.....	ADV. 62.....	ADV. 63.....	ADV. 64.....	ADV. 65.....	ADV. 66.....
ADV. 67.....	ADV. 68.....	ADV. 69.....	ADV. 70.....	ADV. 71.....	ADV. 72.....
	ADV. 73.....	ADV. 74.....	ADV. 75.....	ADV. 76.....	

Name ..... Title .....

Company .....

Street Address .....

Town ..... Zone..... State.....

Extra HELP for Your Crew

Flood or Spot Lights

Chain Tree Saws

Drills and Spades

Manhole Heaters

is easily carried anywhere your crew works. Speeds up maintenance and installation work by making AC current available for lights, saw, drills, manhole heaters, soldering coppers and all other electric tools. Put a portable Katolight plant to work with your crew and watch installation and maintenance costs go down.

Gasoline driven models from 500 watts up. Standard AC and 32 volt DC models. AC or DC Katolight plants for continuous service or standby. Kato single and multi-frequency ringing power to meet all needs.

Write for Details

KATO ENGINEERING CO.

131 Maxfield Ave. Mankato, Minn.

Only HYDRA-LIZER gives SAFETY FOOTING for ALL Conditions by Instant HYDRAULIC ACTION!

Automatic Hydraulic Action ADJUSTS LADDER to TERRAIN Instantly!

Easily attached to ALL Extension Ladders

STEEL TEETH for ICE, Soft Ground, Slippery Asphalt surfaces.

Ball in Socket Shoes conform to ALL surfaces.

ANDERSON Products Co.

P.O. Box 691 • TULARE, CALIFORNIA

- - -Send For Free Folder

ANDERSON PRODUCTS CO.
P. O. BOX 691, TULARE, CALIF.

Kindly send me free Folder on Hydra-Lizer ladder attachment.

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Koppers Develops Test For Douglas Fir

Buyers of pressure-treated Douglas fir are provided with a simple test to differentiate between heartwood and sapwood in increment borings through a new method devised by A. W. Imhoff, chemist for the Technical Department of the Wood Preserving Division of Koppers Company, Inc.

Both treatment and inspection of Douglas fir poles has been hampered in the past by lack of a suitable test for this purpose, R. H. Bescher, manager of the Koppers Technical Department, said. Frequently the extent of impregnation into the sapwood could not be accurately determined because of inability to determine where the sapwood left off and the heartwood began. Treatment to impregnate 100 percent of the sapwood represents the desirable ultimate.

Mr. Imhoff's new test, devised after much study, uses a solution of five milliliters of concentrated hydrochloric acid and ten milliliters of melted phenol, C. P., in 95 percent ethanol to a total volume of 60 milliliters. Slight agitation will cause a complete solution.

The solution is then applied with a medicine dropper to a radial face, obtained by splitting an increment boring. The split boring is then exposed to direct, bright sunlight. In approximately two minutes, the sapwood becomes stained a definite green and the heartwood becomes stained a reddish purple.

Ultra-violet light may be used instead of sunlight. With this, the reaction takes about four minutes and should then be viewed under ordinary light for inspection purposes, rather than under the ultra-violet.

Borings thus treated retain their color distinction for some time if stored in a dark place, Mr. Bescher said.

Electric Products Company Appoints New York Agents

The Electric Products Co., Cleveland, Ohio, has appointed Vincent J. Brown Co. as District Representatives for New York State with the exception of metropolitan New York City.

The Vincent J. Brown Co. maintains offices in Buffalo and Syracuse and will be responsible for promoting The Electric Products Company line of synchronous and induction motors, A-C and D-C motors and generators, Battery Chargers, Electrolytic power supplies and frequency changers.

A Full 5 Inches of Body Movement
With Ease and Safety

BASHLIN'S
New Shifting Tool Dee Safety Belt

Next to Safety in the experienced lineman's book, Accessibility of Tools is of first importance in selecting a Safety Belt. This new Bashlin Safety Belt is designed with sliding tool loops . . . keeps tools within easy reach. And the built-in extra safety factor saves the Safety Strap from wear. It's Safe . . . Practical . . . Comfortable . . . and you *know* it's right. It's Bashlin.

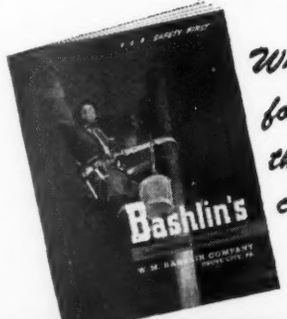
Another First

One piece aluminum sleeve adjusts from 15" to 18" in multiples of ¼". Locked in place with standard steel screws.

Comfort on the job, lightness and safety combine in Bashlin's adjustable Climber with removable gaff . . . Forged of aluminum alloy, the Bashlin Climber is lighter than conventional climbers and the *Same Strength as Equivalent Steel.* It's form fitting and has all the original Bashlin features.

No. BD 14

Removable gaff forged from alloy steel, features triple locking device with standard self-locking tested steel screws



Write for this catalog

W.M. BASHLIN COMPANY
GROVE CITY 1, PA.

INDEX TO ADVERTISERS

A

Acorn Insulated Wire Co. 6
Albion Malleable Iron Co. ..... —
Allied Chemical & Dye Corp., Barrett Division ..... —
Alphaduct Wire & Cable Co. 8
American Creosoting Co. ..... —
American Crossarm, Inc. ..... —
American Electrical Heater Co. ..... —
American Steel & Wire Co. ..... —
American Structural Products Co. 85
American Tel. & Tel. Co. 48, 49
Anderson Products 84
Ansonia Electrical Co. ..... —
Armstrong Cork Co. 66
Automatic Electric Co. ..... —
Artisan Products ..... —
Automatic Electric Sales Corp. 8, 14, 18, 20, 22, 44, 45, 65, 72, 75, 77

B

Barber-Greene Co. ..... —
Bartlett Mfg. Co. 78
Bashlin Co., W. M. 84
Berry & Co., L. M. 7
Bernz, Otto 54
Bethlehem Steel Corp. ..... —
Brach Mfg. Co., L. S. ..... —
Buckeye Telephone & Supply Co. 23, 80
Buckingham Mfg. Co. ..... —
Burden Sales Co. ..... —
Bunnell, J. H. Co. ..... —
Burgess Manning ..... —

C

Cable Spinning Equipment Co. 71
Calculagraph Co., Inc. 21
Chance Co., A. B. 53
Channel Splicing Machine ..... —
Churchill Cabinet Co. ..... —
Cleveland Trencher Co. ..... —
Coffing Hoist Co. 66
Coleman Cable & Wire Corp. ..... —
Colfax Lumber Creosoting Co., Inc. ..... —
Communi-Catering 78
Communications Equipment ..... —
Conroe Creosoting Co. ..... —
Cook Electric Co. 19
Copperweld Steel Co. ..... —
Crane, Carl C., Inc. 78
Cullom & Ghertner Co. 80

D

Daubendieck, C. H. 78
Davey Tree Expert Co. ..... —
Dicke Tool Co. ..... —
Dillon & Co., Inc., W. C. ..... —
Donnelly & Sons, R. R 76
Du Pont De Nemours Co., E. I. 9

E

Electric Products Co., The ..... —
Electric Storage Battery Co. 3
Electronic Supplies ..... —
Embury Mfg. Co. ..... —
Ericcson Telephone Sales Corp. 86
Estwing Mfg. Co. ..... —

F

Faith & Faith 78
Federal Tel. & Radio Corp. ..... —

G

Gieb, H. B. & Associates 78
Gemar, Herman Electric Service 78
General Cable Corp. ..... —
General Insulated Wire Works, Inc. ..... —
General Telephone Directory Co. 2
Giant Mfg. Co. ..... —
Gordon Smith & Co. ..... —
Gould Battery Co. 5
Graybar Electric Co. 67
Greenlee Tool ..... —

H

Haley Co., Inc., R. G. ..... —
Hammond Drierite Co., W. A. ..... —
Henning Electric Motor Co. 70
Highway Trailer Co. ..... —
Hill, Cyrus G. 78
Homelite Corp. 17
Hubbard & Co. ..... —

I

Independent Telephone Repair Co. 80
Indiana Steel & Wire Co. 61
International Harvester ..... —

J

Jacobs Wind Electric Co., Inc. ..... —

K

Ka-Mo Tools, Inc. ..... —
Kato Engineering Co. 84
Kaufman Co., H. J. ..... —
Kearney Corp., Jas. R. 65
Kellogg Switchboard & Supply Co. 10, 11, 12, 13, 58, 59
Kennecott Wire & Cable Co. ..... —
Klein & Sons, Mathias ..... —

L

Leeds & Northrup Co. ..... —
Leich Sales Corp. 40, 41
Lindsay-Spencer Co. 77
Loomis Advertising Co. 43
Lorain Products Corp. 74
Lone Star Creosoting Co. ..... —
Lowell Insulated Wire ..... —

M

MacGillis & Gibbs Co., The 80
Maspeth Telephone & Radio Corp. ..... —
Matuska, Mike ..... —
McCabe Powers Auto Body Co. ..... —
Miller, J. R. Jr., & Associates ..... —
Mitchell, Jay G. 78
Morgan Stanley Co. 47
Morrison Steel Products, Inc. ..... —

N

National Carbon Co. ..... —
National Fireproofing Co. 76
National Telephone Supply Co. 87
Neale Construction Co. 56
North Electric Mfg. Co. 88

O

Oliver Iron & Steel Corp. ..... —
Onan, Inc. 76
Osmose Wood Preserving ..... —
Owens-Illinois Glass Co. ..... —

P

Packer, John W. 80
Page & Hill, Inc. 6
Paragon Electric Co. ..... —
Patterson & Dewar 78
Porcelain Products ..... —
Premax Products ..... —

R

Ray-O-Vac Co. ..... —
Raytheon Mfg. Co. 70
Rebuilt Electric Equipment Co. ..... —
Reliable Electric Co. 24
Roll-A-Reel ..... —
Runzel Cord & Wire Co. 55

S

Schauer Mfg. Co. ..... —
Sherron Metallic Corp. ..... —
Sloan, Cook & Lowe 83
Sound Equipment Corp. ..... —
Southern Electric Transmission Co. ..... —
Stromberg-Carlson Co. 26, 27, 62, 63, 68, 69
Sugarman Equipment Co. 81
Suttle Equipment Co. 76

T

Tallen Co., Inc. ..... —
Taylor-Colquitt Co. 47
Tel-E-Lect Products, Inc. ..... —
Telephone Advertising Inst. ..... —
Telephone Answering & Recording Corp. ..... —
Telefon Fabric Automatic a/s ..... —
Telephone Engineer Pub. Corp. ..... —
Telephone Repair & Supply Co. 57
Telkor, Inc. 70
Texas Creosoting Co. ..... —
Tomkins, A. E. & Co. ..... —
Tufcrete Co. 74
Tug-O-Wheel ..... —

U

Unique Mfg. Co. 74
U. S. Steel Corp. 23, 28
Universal General Corp. ..... —

V

Van Dine, Joe C. 78
Vulcan Electric Co. ..... —

W

Western Electric Co. 73
Williams, Geo. E. 81
Wilton Electric and Telephone Construction Co. 78
Whitney Blake Co. 78
Wooten & Co., L. E. 78

Y

York Hoover Corp. ..... —

The wet wireless of the Amazon jungle

IF YOU can beat a stick on a hollow log, you can send a message on this South American water wireless! With one end of the log in a lake or river, the sound will carry miles under water to a receiver.

Invented centuries ago by Indians, this odd communications system is still used in some deeper parts of the dense and little-explored Amazon River jungle.

Insulators, too, have their part in the history of communication. Since the invention of the telegraph and telephone, the name Hemingray has stood for the highest efficiency and dependability in insulation.

Hemingray Number 22

This advertisement is one of the Hemingray series on the history of communication.

HEMINGRAY INSULATORS

American Structural Products Company

MUNCIE, INDIANA

Subsidiary of **Owens-Illinois Glass Company**

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TELEPHONE EQUIPMENT

is acclaimed the world over for highest quality and performance.

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Telefonaktiebolaget L. M. Ericsson of Stockholm, Sweden, and associated companies are manufacturers of all kinds of telephone and signal equipment of every size and for every purpose.

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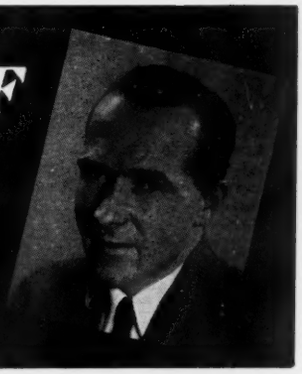
100 Park Avenue, New York 17, N.Y.

THE BACK OF THE BOOK

By JOHN G. REYNOLDS
Managing Editor



"My Telephone Job." . . . An "Old Timer" writing in the April issue of Pacific Telephone Magazine gives out with a thought that deserves repeating . . . "We used to say," writes Old Timer, "that a fellow was in a rut when he stayed on in the same old job. Nowadays, the kids say a fellow is in the groove when he's making progress. The difference is that a rut gets deeper and slows things down, while a groove makes for fast traveling. I think an interested, energetic, resourceful telephone man is certainly in the groove. He is pretty likely to go places, to get bigger and better jobs. And it seems to me the young people nowadays have an even better opportunity for getting ahead, because the business is going ahead, too. . . . Some way or other, it all comes back to a person's own viewpoint, to whether he really wants to get ahead, and is willing to study and put in added effort to get there. . . . "

• • •

Expense Items. . . . Good examples of your tax dollars' whereabouts are found in the following clips from "Tax Review" . . . Rummaging around for excess supplies among its agencies, the General Services Administration reported recently to the House Appropriation Committee, it found one was hoarding a 93-year supply of light bulbs. . . . The Commission of Fine Arts revealed the other day that among projects submitted to it for consideration during 1948-49 were a statue of George Washington for Uruguay, a statue of Simon Bolivar and a memorial to Sacajawea, a woman Indian guide to the Lewis and Clark expedition. No mention, though, of a memorial to that eminent American, Joe Q. Taxpayer. . . . A Congressional committee compromised on a plan to buy two $8,000 revolving doors. It o.k.'d one—then voted to use the $8,000 "saving" by buying 1,000 new desk lamps. The $16,000, incidentally, is equivalent to the income taxes derived from 160 families (married, 2 dependents) with net income of $3,000. . . .

• • •

A Longer Life For Poles. . . . The Telephone Bulletin, published by Southern New England T & T reports—"We can count on longer lives for thousands of our telephone poles because of a patented wood preservative called Osmoplastic.

"This year about 10,500 poles will be treated with Osmoplastic (coating applied from about six inches above ground to 18 inches below) which penetrates the wood and arrests decay for seven to ten years.

"In all, 88,000 poles will be inspected this year, and for the first time the inspection will be conducted by the Osmose Wood Preserving Company—developers of Osmoplastic."

The inspection procedure followed by the Osmose Company parallels that followed by Southern New England inspectors in previous years, and in addition they will apply the new preservative where needed. All poles will be visually inspected and if necessary checked further by soundings and borings.

The 88,000 poles to be inspected this year represent about one third the Southern New England total—approximately 269,000.

THIS *Nicopress* SLEEVE

plus

THIS *Nicopress* 17-2 TOOL

Make better pair splices faster than you've ever made them before!

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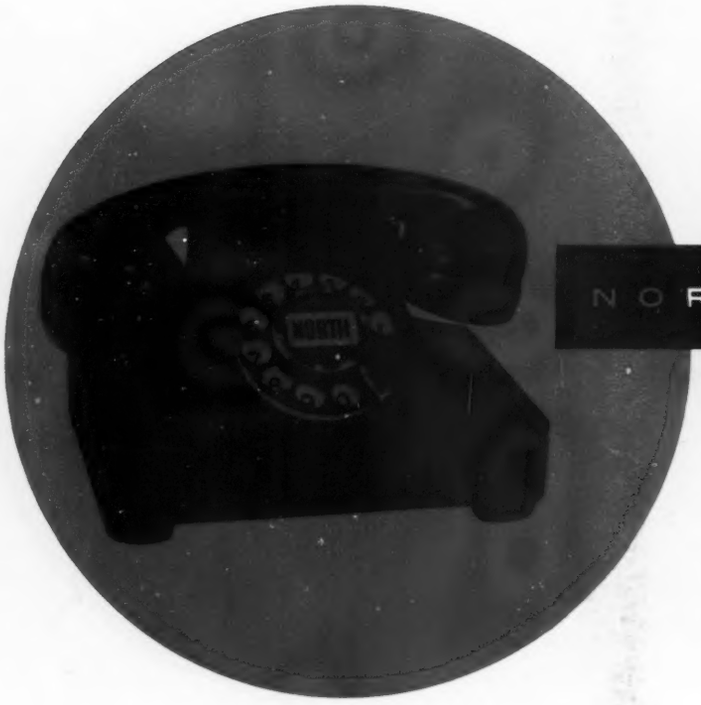
YOUR BEST INVESTMENT NORTH TELEPHONES IN THE LONG RUN



● What do you want most in a telephone? Service? Top quality? Dependability? Excellent operating features? Good design? When it comes to the point of dollar investment in telephones, you want each and every one of these features. They are assurances that your telephone investment will give you the maximum return during the future decades they are in use.

Frankly, we're just a little proud that many of the thousands of NORTH Telephone users take the time out to tell us that NORTH Telephones meet and surpass all of these feature requirements. We're also proud to know that in the trade, the NORTH label stands for years of telephone research and development.

Take a tip from hundreds of progressive telephone companies across the country who have found out that, "NORTH Telephones are your best investment . . . in the long run," and order NORTH Telephones today.

THE NORTH ELECTRIC MANUFACTURING CO., Galion, Ohio, U. S. A.

Originators of **ALL RELAY** *Systems of Automatic Switching*